Desert

FEBRUARY, 1956 . . . 35 Cents

Mariposa Lily. Photograph taken by Josef Muench in the Petrified Forest National Monument of Arizona.

DESERT WARMTH

By Saxon White Taylor
Grangeville, Idaho

Today my mind is free from care,
For I am desert bound.
I'll inhale the soft warm air,
Absorb warmth from the ground.
No more ice to gnaw away
The marrow from my bones;
The desert sands I find today
Will ease my frozen moans.

I'd rather live on desert sands
Alone until I die,
Than live in far more settled lands
Where drifted snowbanks lie.
In drifted sands I'm at my ease
In minimum attire.
Give me cactus for my garden, please,
And desert sun for fire.

• • •

RANDOM PATTERN

By Anona McConaghy
Downey, California

Crisscrossed tracks in morning
Before wind plies her broom,
Reveal nocturnal frolics
In sand dune rumpus room.

DESERT PEACE

By Marie L. Weaver
Ventura, California

The desert night hurled down a thousand stars
And bathed my soul in quiet ecstasy,
From din of bruising city strife I came
To calmly look, and lo, it rested me.

Dreams

By Tanya South

Give me a Dream. And I shall rise
And struggle upward, daring, doing,
Searching with boundless Faith the skies,
And endlessly my Dream pursuing.

Dreams are the core of mortal Fate.
They are the root, the source of Man.
No height can be attained, no state,
Save one can weave some Dream to span.

February

By Eva L. Robinson
Los Angeles, California

It's true that winter's on the wane,
For daylight hours are showing gain.
If drab and dry the desert lies
Beneath the cold and cloudless skies.
I do not moan, for this I know—
The desert will awake and glow
As wave on wave of colors flow—
If there is rain.

I love the desert's calm repose
In garb of gray and mauve and rose—
Its tinted dawn—its sunset skies—
Its silent mountain peaks that rise
Like sentinels to guard the plain.
From all that hunger to obtain
Possession of the vast domain—
If there is rain.

We lift our eyes and pray there will
Fall blessings from the skies until
The dormant life without a sound,
Springs up in legions from the ground.
Buds will appear mysteriously,
To bloom in grace and purity,
Where there is none but God to see—
If there is rain.

• • •

UNTOUCHABLE

By Grace Barker Wilson
Kirtland, New Mexico

The tawny, untamed desert stretches on
In sandy dryness of unnumbered years.
No civilizing thing yet interferes
As endless time is marked from dawn to dawn.
No point of conquering plow yet penetrates
The wastes that lie around the stony peaks
In desolation. There the redman ekes
A meager living as he concentrates
His energy upon a flock of sheep
That draw scant strength from scattered wisps of grass.
Unchanged, unchanging as the decades pass,
The frontier stops, and progress is asleep.

• • •

BRIGAND

By Vada F. Carlson
Winslow, Arizona

The chaparral cock—droll desert cuckoo!—
Is an arrogant, feathered brigand,
Who, having adapted himself to his home,
Grows fat on the lean of the land.

His diet may shock some folks, but it's true
That his daily delight is to munch
On lizards and centipedes, spiders and bugs,
With a scorpion thrown in for lunch.

The shade of a rock, or a cholla, will do
For this bird of the sun and the sand,
Who, like Robin Hood, does his quota of good—
Let's give the brave fellow a hand!

• • •

DESERT FLOWERS

By R. C. Hyder
Montebello, California

When atmosphere is crystal clear
And skies are deepest blue,
And desert flowers like clustered bowers
With tints of vivid hue

Embrace the earth with fresh new birth
As far as eye can see
With fragrance sweet, and seem to greet
With gladness, you and me,

In splendor fair, I stand and stare
With deep humility,
Proud of this land from God's own hand
He gave to you and me.

DESERT CALENDAR

Feb. 2—Candlemas Day Ceremonial Dances at San Felipe, Cochiti and Santo Domingo Indian Pueblos, New Mexico.

Feb. 2-5 — Imperial Valley Carrot Festival, Holtville, California.

Feb. 2-5—$15,000 Open Golf Tournament, Phoenix, Arizona.

Feb. 3-5—Parada del Sol, Scottsdale, Arizona.

Feb. 4-5 — Rodeo, sponsored by Mounted Police, Palm Springs, California.

Feb. 5—Desert Sun Ranchers Rodeo, Wickenburg, Arizona.

Feb. 5—Dons Travelcade to Jerome and Montezuma Castle National Monument, from Phoenix, Arizona.

Feb. 6-12 — Southwestern Livestock Show and Rodeo, El Paso, Texas.

Feb. 7—Pancake Race, Clayton, New Mexico.

Feb. 8-12 — Open Golf Tournament, Tucson, Arizona.

Feb. 10-11 — Square Dance Festival and Fiddlers Jamboree, Phoenix, Arizona.

Feb. 10-12 — University of Nevada Winter Carnival, Reno Ski Bowl.

Feb. 10-12—19th Annual Invitational Tennis Tournament, Racquet Club, Palm Springs, California.

Feb. 10-13 — Outdoor Art Show, Phoenix, Arizona.

Feb. 11-12—Jaycee Silver Spur Rodeo, Yuma, Arizona.

Feb. 11-12 — Western Saddle Club Stampede, Squaw Peak Mountain, Phoenix, Arizona.

Feb. 13—Audubon Screen Tour series, Ogden, Utah.

Feb. 15—Major League Spring Training begins, Giants at Phoenix, Cubs at Mesa, Orioles at Scottsdale, Indians at Tucson.

Feb. 16-19—Western Air Force Conference Four-Way Ski Meet, Reno, Nevada, Ski Bowl.

Feb. 16-22 — Riverside County Fair and National Date Festival, Indio, California.

Feb. 17-18—Square Dance Jamboree, St. George, Utah.

Feb. 18-19 — Indian Dance Show, sponsored by Dons Club, Phoenix, Arizona.

Feb. 19-26 — Ninth Annual Cactus Show, Desert Botanical Gardens, Phoenix, Arizona.

Feb. 21-25—Maricopa County Fair, Mesa, Arizona.

Feb. 22-26—Better Homes Exposition, El Paso, Texas.

Feb. 23-26 — La Fiesta de los Vaqueros, Annual Rodeo, Tucson, Arizona.

Feb. 25-March 4 — California Midwinter Fair, Imperial, California.

Mid-February—Mid-Winter Ski Carnival, Aqua Piedra Ski Run, Tres Ritos, New Mexico.

February—Arts of the Navajo, Southwest Museum, Highland Park, Calif.

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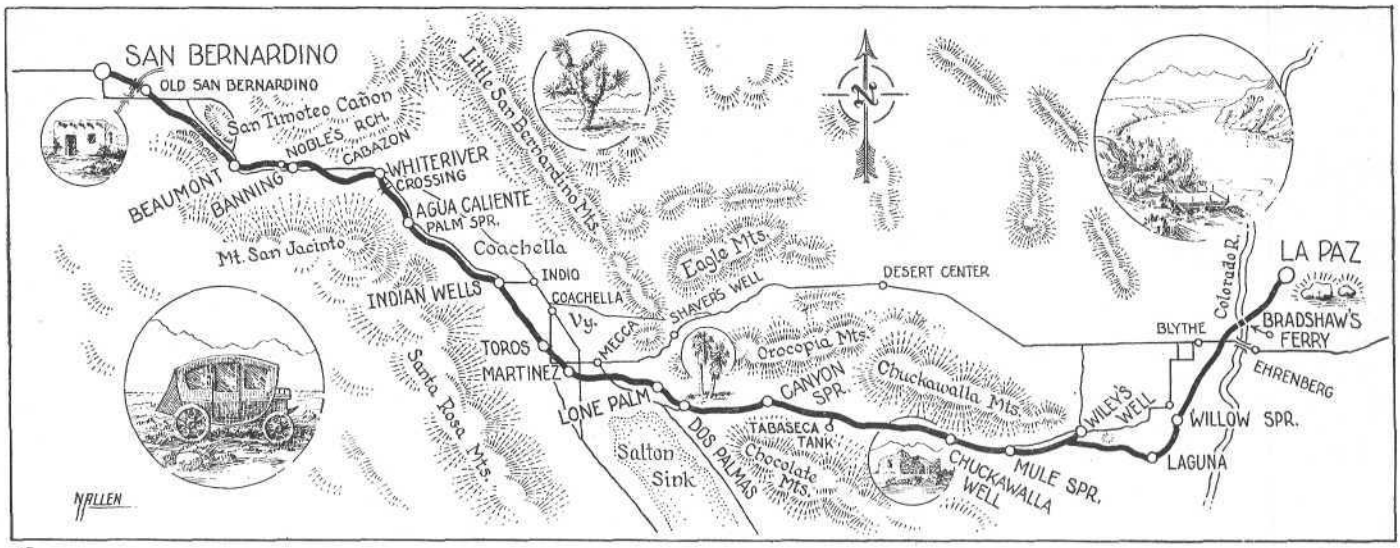


That portion of the old Bradshaw road between Tabaseca Tank and Mule Spring (now dried up) is now in the Navy's Chocolate Mountain Bombing range, and although the route is passable for 4-wheel drive cars, it is open to the public only on weekends.

Bradshaw's Road to the La Paz Diggin's

When word reached Los Angeles in the early 1860s that a rich placer gold field had been discovered along the Colorado River at La Paz, there was a stampede of fortune hunters. But it was a slow-moving gold rush, for the only known routes to the new field required a detour of nearly 200 miles. Bill Bradshaw, former trooper with Fremont, solved the problem by blazing a new trail across the Southern California desert—the Bradshaw Road. For a few years, until the gold played out, it was the most-traveled route across the California desert. Today only a few of the old waterholes—and the wagon ruts—remain.

By FRANKLIN HOYT
Map by Norton Allen

DURING THE winter of 1862 Pauline Weaver was trapping beaver and prospecting along the Arizona side of the Colorado River. About 10 miles north of where the present highway crosses the river at Blythe he found flakes of gold sparkling in the bottom of a little gulch. Panning out two or three dollars worth of the yellow metal, he placed it in a goose quill for safe keeping while he continued his trapping. A few weeks later in Fort Yuma, Weaver proudly displayed his golden quill in all the saloons, and the Colorado River gold rush was on. By summer the Los Angeles newspapers were printing stories of 150 Americans, 500 Sonorans, and 2000 Indians working the placers near the little village of La Paz.

Reaching the mines was not easy. Perhaps the most comfortable way to do so was to board one of the ships which regularly sailed down the coast from San Francisco and around the tip of Lower California to the mouth of the Colorado River. Here the miner could buy a ticket on one of the steamers which puffed 300 miles up the river to Fort Mojave. But the sailing ships were slow. A faster way to reach the mines was to take one of the stages which jolted and bounced out of Los Angeles to Warner's Hot Springs and thence along the route of the old Butterfield Stage line to Yuma, Arizona. A rough 60-mile trail continued north parallel to the Colorado River to the scene of the new mining strike.

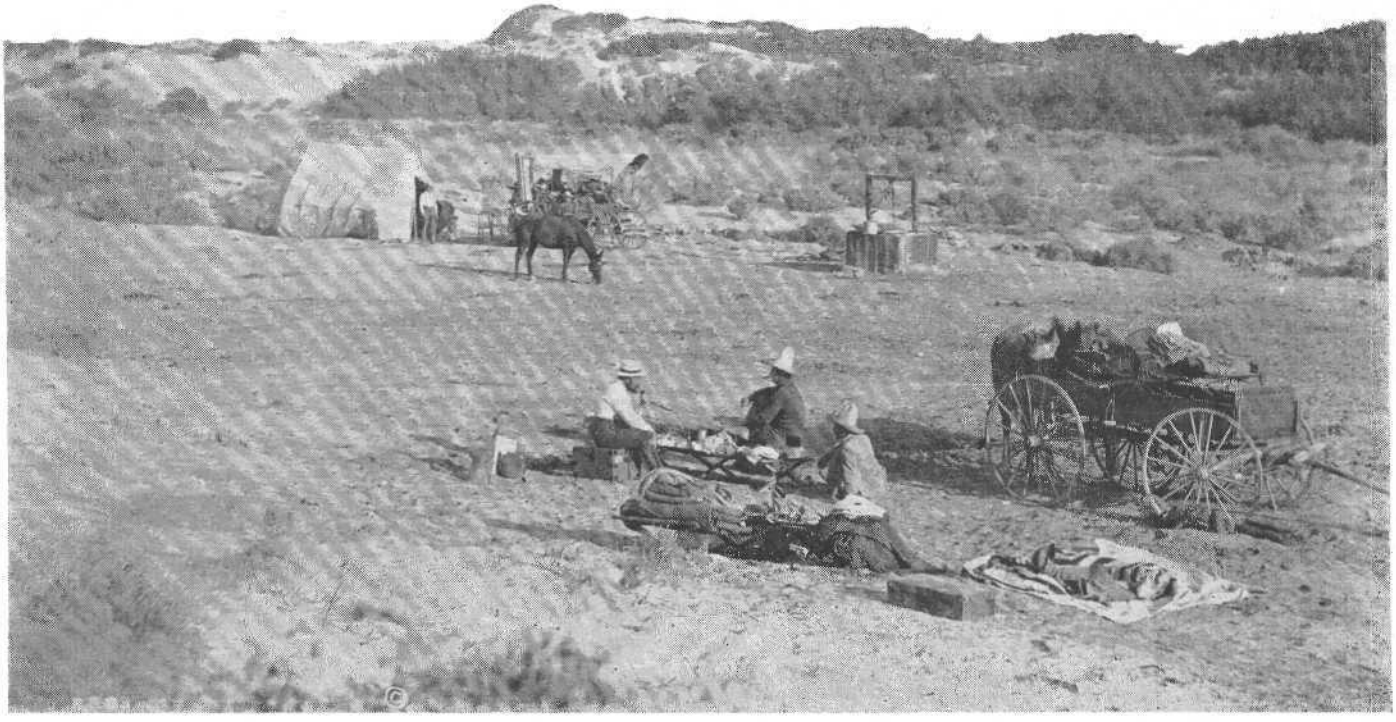
An alternate route passed through San Bernardino, thence over El Cajon pass and along the old Mormon trail to Fort Mojave, across the river from the present site of Needles. From Fort Mojave it was a tedious journey over the trail to the mines at La Paz.

Gold-seekers, always in a rush, wanted a more direct route from Los Angeles and San Bernardino to La Paz. Among them were impatient men who sought to blaze a new route through the San Gorgonio portal to the Salton Sink and thence through the Chocolate Mountains to the Colorado.

William D. Bradshaw of Los Angeles, who was described by writers of that day as a bold, courageous adventurer, was one of the first to recognize the need for a direct route to the rich placer diggings. Stories differ as to whether it was Chief Cabezon of the Pass Cahuilla Indians, or one of his tribesmen, who drew a rough sketch for Bradshaw, showing the waterholes along the old Indian trail which extended across the desert eastward to the Colorado River.

In May, 1862, with this map as his only guide, Bradshaw rode out of San Gorgonio Pass to the river. In a few days he returned, and the San Bernardino newspaper told the advantages of the proposed new road which Bill Bradshaw announced he would build without delay. Although wagon travel over the new route at first was difficult, it saved several days' time over the Fort Yuma and Fort Mojave routes, and within a few months was the most popular route to the diggings.

Hubert Howe Bancroft, an enterprising San Francisco book publisher, sent one of his employees to the mines over the new road and the bookstores were soon selling a little volume en-



This picture of Indian Wells, one of the watering places on the Bradshaw road, was taken by C. C. Pierce in 1903. The bearded man with the pipe was George Wharton James, the author, and facing him with the straw sombrero was Carl Eytel, Palm Springs artist.

titled *A Guide to the Colorado Mines*. Thousands of these booklets were sold but only two copies are now in existence—one in a private collection and the other in the State Library at Sacramento.

The *Guide* advised the miner to provide himself with a rifle and revolver for protection against renegade Indians and if the party was large it should also take a shotgun for hunting rabbits and quail. From Los Angeles it was suggested that the miner take the main wagon road to San Bernardino which passed through San Gabriel, El Monte, San Dimas (then known as Mud Springs) and Cucamonga. San Bernardino was the outfitting center for travelers over the Bradshaw Road, and here horses could be secured and provisions purchased before beginning the long haul over the desert to the river.

From the Mormon village the road passed about two miles southwest of the present town of Redlands and then twisted up San Timoteo Canyon to the future site of Beaumont. Here the Bradshaw Road through San Gorgonio Pass began.

Near Cabazon the route swung south of the present highway, crossed Snow Creek, and forded the White Water River, "a large stream of pure cold water, coming down from Mount San Bernardino, and which after crossing the road twice, runs along it for a mile and a quarter, when it bears off to the north-east, and after running a few hundred yards, sinks in the sand."

From White Water the wagon track skirted the base of Mt. San Jacinto, following the route of the present state Highway 111 to Palm Springs, which was then known as Agua Caliente. The road followed present Indian Avenue, one of Palm Springs' main streets, to the Indian village located near the hot springs. Here the *Guide* offered the information that the Indians were Christianized and "have a large settlement, and cultivate the land, raising corn, barley, vegetables, etc., all of which they readily sell to whites, when they happen to have any on hand. . . . The proper place to camp here is one mile east of the village, where animals will not disturb the Indians' patches of corn and grain, which are unfenced and where there is fine water and grass a few hundred yards south of the road. Agua Caliente takes its name from a large spring of warm sulphur water three or four rods to the left, as we enter the village from the west. It forms a large pool, of proper depth and temperature for bathing, for which it would be well adapted were the mud cleaned out."

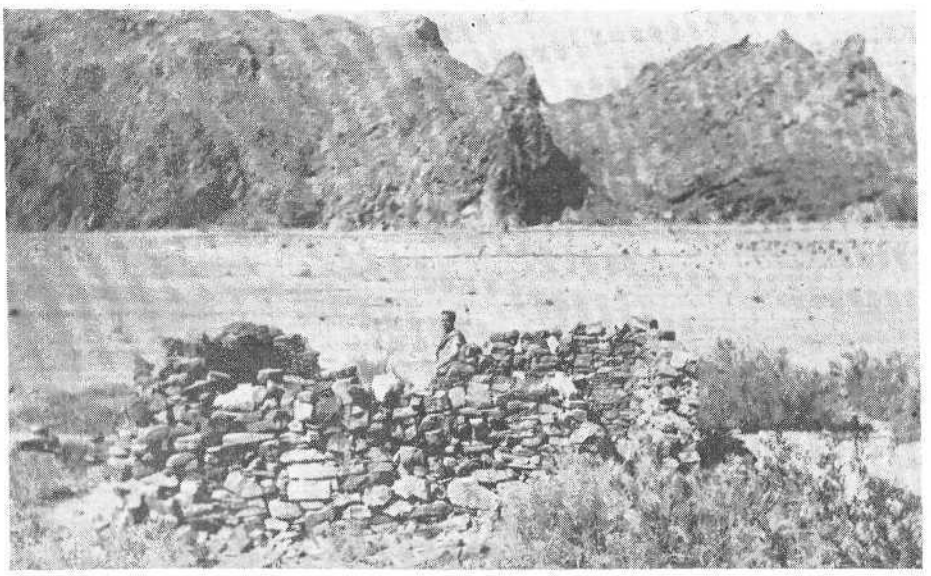
After leaving the beautiful oasis of Agua Caliente, the road meandered through deep sand easterly for about 11 miles until the next water hole was reached. This was Sand Hole, "a muddy pool about 400 yards east of the road, and which, as it consists only of a collection of rainwater in a small clay basin, is always bad, and dries up early in the summer.

The next good water was six miles from Sand Hole at Indian Wells, then called Old Rancheria. In order to avoid deep washes and projecting spurs of the Santa Rosa Mountains, the Bradshaw Road ran north of Indian Wells. To reach water travelers were forced to detour two miles south where the wells were located along a sandy wash surrounded by cool cottonwood trees. These wells and the cottonwoods were washed out in the 1927 flood, but the sandy wash may still be seen a few hundred feet north of the highway.

From Indian Wells the present highway goes east to Indio, but the Bradshaw Road turned southeast along the edge of the hills through the old Indian village of Torres and on to the vicinity of the Fish Traps where the road turned sharply to the east and passed through the Indian settlement of Martinez where there was water in a few deep wells about a quarter of a mile from the road.

"This is another Indian village, much scattered, but containing several adobe structures, makes a more pretentious appearance than the others. Corn and sometimes barley can be had here. The place is embowered with mesquite trees, which grow with great luxuriance, the bean being gathered in large quantities by the natives. It forms an excellent food for animals when they get accustomed to its use."

Leaving the Indian settlement of Martinez behind, the dusty road took a course almost due east through the



The ruins of the old Bradshaw Canyon Springs stage station along Salton Creek may still be seen today. This picture was taken in 1937.

present town of Mecca, and along the route of Highway 195 until it reached a point about four miles east of Mecca. Here the trail continued easterly along the Mecca Hills until it reached the next watering place at Palma Seca, Lone Palm or Soda Springs, as it was sometimes called. This was 12 miles from Martinez "with heavy road most of the way. Here there are several deep pools of limpid, but very bad water, being strongly impregnated with soda and sulphur. There is but little grass, and as animals do not like the water, it affords but an indifferent camping place."

Although there was heavy sand most of the way, the traveler would be wise to struggle on seven more miles to Dos Palmas where there was "a deep pool of soft soda-water, but of a more palatable kind than at Palma Seca. It discharges a large stream, which, flowing down, has caused several acres of salt grass and tule to spring up near by. Animals do not much relish this kind of feed, and the traveler will do better to take his stock three miles to the southwest, where there are several large springs or ponds, of better water, with an abundance of cane grass, on which they will do well. Enough mesquite here, as there will be found at nearly all camping places, from here on, for fuel."

After leaving Dos Palmas the road continued east for several miles and then turned north along Salton Creek. Passing through a narrow canyon, or the Big Wash, as it was commonly called, the road then turned southeast again toward the Chocolate Mountains. About eight miles from the mouth of the Big Wash another good camping place was reached at Tabaseca Tank, located "two miles west of the wagon road. Plenty of good water, and a moderate amount of bunch grass. No fuel."

Between Tabaseca and the next water at "Chucolwalla" there were 18 miles of hard going, more than half of it through heavy sand. Here there was plenty of water, grass and wood, but the miner was cautioned that his horses should not be allowed to graze "as there is a species of cactus in this section of the country very abundant, which, fastening upon them when suffered to run loose, causes great trouble. The Indians will bring enough grass to keep an animal a whole day for a couple of bits."

Between Chuckawalla Well and the Colorado River there was a devilish stretch of 35 miles. "About one-third of the way heavy sand, one-third sharp, volcanic stones, hard on the horses' feet; balance, good road. Water is reported to have been found half way across this stretch since the writer passed over." The river was reached below Blythe, and there were six miles of hard traveling through deep sand and around numerous sloughs until the Bradshaw Ferry was reached. This primitive ferry crossed the river near the present highway bridge between Blythe and Ehrenberg.

Early in September, 1862, Mahlon D. Fairchild traveled over the Bradshaw Road, and his diary tells an interesting story of the dangers and hardships of this desert road to the Colorado River mines. Fairchild and his companions arrived at San Pedro on the steamer *Brother Jonathan,* and the following day started out over the wagon road for San Bernardino, camping overnight at El Monte and Cucamonga. From San Bernardino the miners followed the customary route through San Gorgonio Pass to White Water and Agua Caliente.

At the Indian village of Torres there was an epidemic of measles and the children were dying by the dozens. "The weather was very hot; children with skins spotted with the disease . . . would be sprinkled with water ejected from the mouths of the squaws to cool them off. . . . Generally the Indian huts were made of stout posts about five feet high with sides and roof thatched with boughs and coarse grass. Into several of these I saw them pile infant corpses with clothing and various other things and set them afire."

At Martinez, Fairchild became disgusted with the slow-moving wagon and taking a companion with him, set out on horseback. The first day they traveled at a leisurely pace and reached Dos Palmas in plenty of time to make camp before dark. From Dos Palmas the two men traveled in an easterly direction over the high mesas, but found no water all day and that night were forced to make a dry camp. The following day they reached Tabaseca, where there were two springs of fair water but no grass for the hungry horses. "Here we found the shells of a large tortoise the flesh of which had evidently been eaten by Indians. . . . I carried one into camp and cooked its flesh. . . . Though there was considerable meat upon the carcass of the reptile, I admit that I did not relish it as well as I did the ordinary plain 'jerky' — perhaps on account of the manner of cooking.

Stopping at Tabaseca only long enough to eat and allow the horses to drink, they hurried on to "Chucawallah." At this spring they found water, but still no feed for the horses because the grass had been eaten by the horses of other parties which had preceded them. Their rations were almost gone so they decided to camp until the wagon arrived. During their second day at Chuckawalla a welcome visitor arrived—a "squaw man" who lived with the Indians near Warner's Ranch and who was traveling alone across the desert with his burro. "His business upon the desert trail I did not learn, for it was not 'good form' to be too inquisitive." He was well supplied with jerky and *pinole* which the Indian squaws had made from parched and pulverized grass seeds. "To us it was first rate diet at that juncture, and he gave us a liberal supply, with *carne seca* galore, for which he would accept no coin."

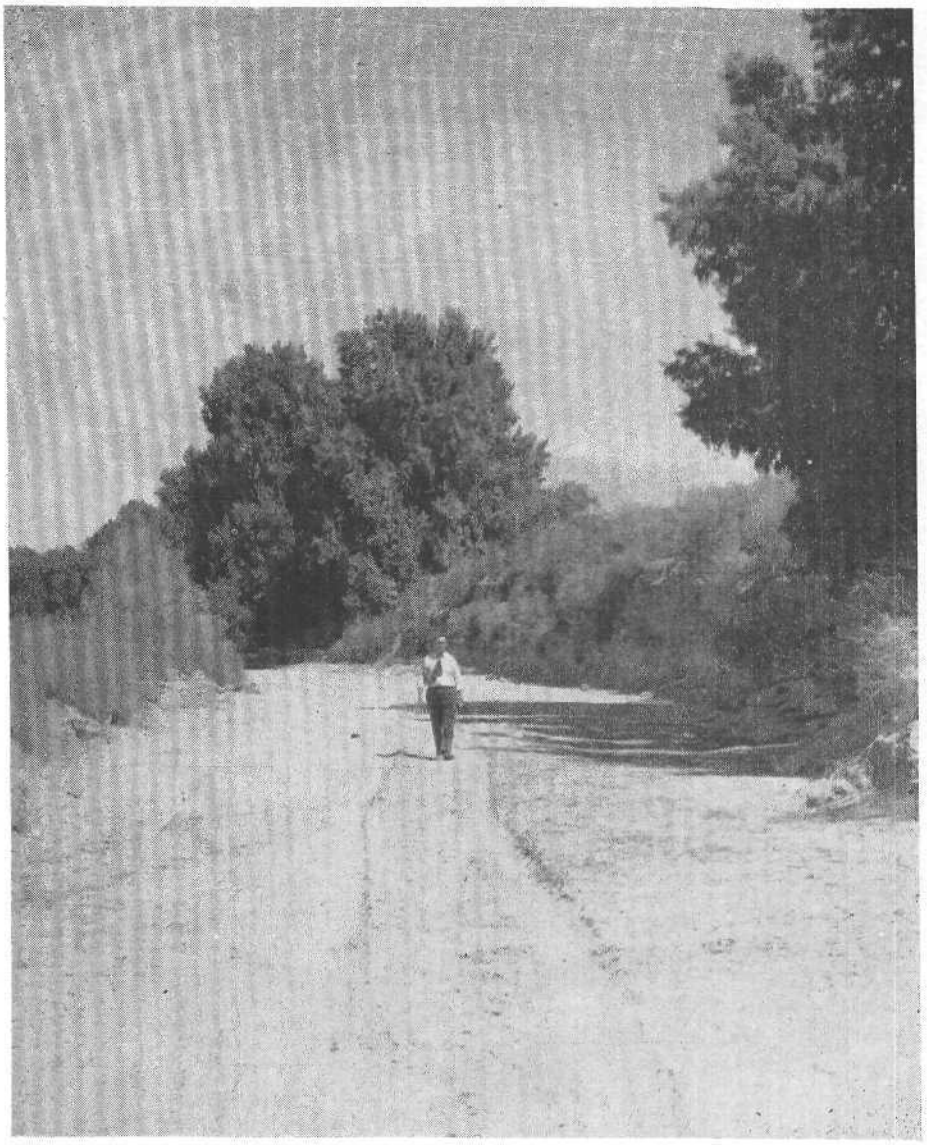
For four days they camped at Chuckawalla, impatiently waiting for the wagon. Finally, on the 7th of September, Fairchild and his companion decided not to wait any longer but to push on to the river. Traveling mostly

at night because of the extreme heat, they reached the Colorado in two days. "We had reached Bradshaw's ferry, opposite the town of Olivia, now Ehrenberg. The ferry was established by William Bradshaw, a former member of Fremont's expeditions. A rude boat capable of carrying wagons and a limited number of animals, attached to a rope spanning the stream, the current being the propelling power, comprised the affair. . . . On the 10th day of the month, the wagon and party we had left at Martinez arrived, all well, but with animals pretty badly used up."

It was several months before the Bradshaw Road was universally accepted as the best way to reach the mines. Advocates of the Fort Mojave route claimed that the new road was dangerous because of the scarcity of water and the chances of getting lost. During the summer of 1862 the new road suffered a severe setback when the Charles Yates party of five men, and the Garrett family of father, mother, and five children, became lost on the Bradshaw Road and all died of thirst. Commenting on these tragedies, a letter in the Los Angeles *Star* said: "I traveled on the well known road to Fort Mojave. If the parties that were defeated on the Cabazon Desert had gone by the Mojave route, they would now have been at the mines, and none would have lost their lives."

The new road became accepted, however, and by the fall of 1862 most of the miners were using this route. Bradshaw did his part in popularizing the road by giving enthusiastic interviews to the newspapers and by guiding miners over the new route. In August of 1862 he personally led a party of 150 miners from San Bernardino to La Paz.

Freight wagons and pack trains began operating over the road soon after it opened, but it was not until early in the fall of 1862 that the first "coach and six" came dashing into La Paz. This was the first stage of a new line from Los Angeles to the Colorado River, established by Warren Hall and Henry Wilkinson who were working for the Alexander Company of Los Angeles. With more than $5000 in gold dust in the "boot," the stage raced back to Los Angeles in four days, setting a new record. For a few weeks the stages operated regularly from Los Angeles to the river, usually carrying a full load of miners who were willing to pay the $40 fare. Concord coaches were built to accommodate nine passengers inside, and six more could be perched on top, but more than double this number were sometimes crowded on. It is said that one stage left San Bernardino with 35 passengers, "not counting the driver and a Chinaman."



This sandy wash near Indian Wells was part of the route followed by Bradshaw freight wagons and stages.

About a month after the first coach clattered into La Paz, Hall and Wilkinson were murdered by a disgruntled station keeper near Dr. Smith's ranch in San Gorgonio Pass. The employee was arrested and brought to trial in San Bernardino, but the jury believed his story that he had shot in self defense and he was acquitted. After the death of Hall and Wilkinson the Alexander Company abandoned its ill-starred venture. For the next few years open freight wagons continued to carry cargo and passengers to the mines, but apparently there was no regular stage line in operation.

For a short time during the winter of 1867 Banning and Company, one of the leading Southern California transportation companies, tried to use the route through San Gorgonio Pass for its stages to Yuma. This new route followed the Bradshaw Road to a point about one mile east of Dos Palmas where the road to Yuma branched off toward the south. Late in February Pat Murray, one of the drivers for Banning and Company, left Yuma over the new route with one passenger and some freight. Half way between Yuma and Dos Palmas he lost the trail because a station camp had been removed, and they wandered for three days without water. In desperation the horses were turned loose, and they led Pat and his passenger to Frink's spring.

The newspaper account of this near-tragedy said that it was understood "that the stock of Banning and Co. have been removed from the newly laid out road to Fort Yuma branching from Dos Palmas, on the line to La Paz. It is unnecessary to say that the road was utterly impracticable, a desert country of nearly a hundred miles rendering it impossible for stock to travel, with sand up to the hubs."

Uncle Sam gave his approval to the Bradshaw Road in 1868 when the Post Office Department announced that it had abandoned the old mail route from San Bernardino to Prescott, by way of Cajon Pass and Fort Mojave. A new contract was awarded for carrying the mail over the Bradshaw Road to La Paz, Wickenburg and Prescott; mail for Fort Yuma was taken off at La Paz and sent down the river on the steamers. Until the completion of the Southern Pacific Railroad, almost a decade later, buckboards and light wagons continued to carry the mail over this route to western Arizona.

Compared with other desert roads of the west, the Bradshaw Road was well supplied with water, the average distance between water holes being about 10 miles. Between Chuckawalla and the river it was necessary to travel 35 miles without water, but later a well was developed half-way across this stretch. Along the old Mormon trail between San Bernardino and Salt Lake City the distances between watering places were much greater. In one place there was a pull of 55 miles without water of any kind.

With all of its advantages the Bradshaw Road was never very successful. Articles in the San Bernardino newspapers complained that it ran in an "angling, crooked, roundabout course, over deep sands, and entailing 40 miles of unnecessary travel." In 1872 Franc V. Bishop wrote a letter to a friend who asked the best way of getting to the mines. It was easy, he said; just take the stage from Los Angeles to San Bernardino, and from there to Ehrenberg and you are in Arizona. "You would have a pleasant ride to San Bernardino, see a queer pretty town and lots of Mormons, but having seen it had better return to Los Angeles, for between you and the Colorado lie 300 miles of desert travel, and more than likely there are no covered stages running. So take the steamer."

Clarence King rode a mule across the Bradshaw Road from La Paz to San Bernardino in the spring of 1866. He later wrote that the road was not well marked and that he had difficulty following it in places. "Indian trails led out in all directions, and our only clue to the right path was . . . two conspicuous mountain piles." He camped at the oasis of Palm Springs where there were two palm trees and near the palms a "low, deserted cabin with wide, overhanging flat roof, which had long ago been thatched with palm leaves."

During the 1870s the wife of an army officer stationed in Arizona traveled by stage from Tucson to San Francisco over the Bradshaw Road. When the coach pulled up at the Chuckawalla station for lunch they found that Indians had made a raid and gotten away with most of the food during the night. The meal was cooked and served by the station keeper who stood at her elbow with a "battered, grimy, and unclean looking coffee-pot," and asked, "will yer have coffee, tea, cocoa, chocolate, or milk?" Then before she had a chance to reply he added, "Yer'll have to take coffee, dam'it, for that's all there is."

In the spring of 1876 the Southern Pacific Railroad finished laying its tracks down the San Gorgonio Pass to White Water. Arrival of the railroad spelled doom for the Bradshaw Road, but for a few months it had more traffic than at any time during its brief history. Instead of taking the steamers around Lower California, many travelers bound for Arizona found it more convenient to take a Southern Pacific train out through San Gorgonio Pass to the end of the line where they could board "new first-class coaches" for Ehrenberg, Wickenburg, Prescott, Phoenix, Florence and Tucson. The stages left two or three times a week, depending upon the arrival of trains from Los Angeles and San Francisco, and the trip to Prescott took four days.

By the spring of 1877 the railroad reached Pilot Knob and the stages to Arizona abandoned the Bradshaw Road and began running their coaches into Yuma. All along the new railroad towns began to spring up—Beaumont, Banning, Indio, Coachella, Thermal, Mecca. With the building of these towns new roads were constructed and old roads improved. Some of these new roads followed the Bradshaw Road, but stretches of the old stage route were abandoned. In some places only a track remains—in others drifting sand has covered the road until not a trace is left. From Dos Palmas to the Colorado, Riverside County maps still show the Bradshaw Road as an unimproved road, still traveled by a few hardy prospectors and desert rats with their burros and desert automobiles.

Hard Rock Shorty
of Death Valley

The station wagon which had just stopped at the gas pump in front of the Inferno store bore Kansas license plates.

The clerk was busy in the store and Hard Rock Shorty walked out to see what the tourist wanted.

"See you're from Kansas," he drawled, "back where they have all them cyclones."

The visitor grinned. "Yep, it blows back there once in a while," he agreed.

"I've heard about them twisters," Shorty continued, "an' how they do a lot o' funny things like liftin' the cookstove right outta the kitchen without breakin' the fried eggs in the skillet.

"We had one o' them tornaders out here ten twelve years ago. That's what started my partner Pisgah Bill, to lookin' fer that lost mine o' his.

"Wind blowed so much sand we had to shovel our way out to the woodpile to get mesquite fer the stove. Next day it died down a little, but they wuz so much dirt in the air it rained sand fer three days after the wind quit blowin'.

"Pisgah Bill went out to the spring to git some water to wash up a little. Time he got back to the shack the wash pan wuz half full o' sand. Bill went ahead and did his scrubbin' an' when he started to throw the water out he saw somethin' shinin' in that sand in the bottom of the pan.

"He took another look an' then let out a yell—

" 'It's gold, Shorty, it's gold!'

"So we got busy an put out all the pots an' basins an' tubs we had around the place to ketch as much o' that sand as possible.

"After the sand quit rainin' Bill got busy pannin' the stuff. Got a lot o' fine gold an' some nuggets as big as a pea. Had $167.50 worth of gold when he got through.

"An Bill's been lookin' fer the placer field where that cyclone picked up that sand ever since. An' between times he's readin' books and writin' to the scientific fellers hopin' he'll get a clue to where the tornader started from an' how it got here. Yep, them cyclones does funny things!"

Before the Law Came to Borrego

Many people ask how Collins Valley in the Borrego State Park of California got its name. Here is the story, as told by a man who was a witness to some of the tragic events which took place in that remote desert wilderness over a half century ago.

By H. E. W. WILSON

A FEW YEARS ago a memorial plaque was erected along Coyote Creek in California's Borrego State Park as a tribute to Captain Juan Bautista de Anza and his band of courageous settlers who came this way in 1776 to establish the first white colony in California at Monterey.

Nearly 125 years later, another staunch white man came to Coyote Creek and tried to establish a home there—a man whose courage should be remembered, even though no monument ever has been erected to honor him and his fine family.

I am referring to John Collins for whom Collins Valley was named.

My acquaintance with the Collins family began in early October, 1900, when Frank Hike and I went to Coyote Creek on a prospecting trip. We drove from Los Angeles in a Studebaker farm wagon drawn by two fine horses. We camped along lower Coyote Creek because of its splendid water supply.

One day Hike walked up the creek and came to a little clearing in which was a house built of native materials, occupied by a man, his wife and their three small children, two boys and a girl—the Collins family.

When Frank told me about it I was quite surprised. We had traveled from Julian to Borrego Spring, and across Borrego Valley to Coyote Creek in a raw desert so uninhabitable that it seemed to be about the last place on earth to which a man would bring his family. But Collins had the heart of a frontiersman.

We became better acquainted with the Collins family. Then my partner decided to return to the city. He suggested that I get Collins to help me move my camp outfit nearer to his home. He left his tent and camp equipment with me with the understanding that when I went back to Los Angeles I would return it to him.

Collins used his four burros to pack my gear to a site near his house. We put up the tent and built a mesquite fence around it to keep the stock away.

For 13 months, over a period of four winters, John Collins and I prospected and hunted for lost mines. When one makes desert trips with a companion or partner and the two work, eat and sleep together, they get to know each other very thoroughly and that was the case with John and I. He was a fine man, liked by all who knew him, and he liked everyone. He was a real man, with no prejudice toward race, color or creed.

When an Indian rode up Coyote Creek, John would always invite him into his home where Ella Collins would give the traveler something to eat. The Indians all liked John and were willing to do almost anything for him.

Bernado Segundo was chief of the tribe on the San Ignacio Reservation. He had been educated at the Sherman Institute at Riverside and spoke very good English. He told John many things about the Indians and the Salton Sink desert country where his people formerly had lived. I met Segundo twice and liked him very much.

But, all was not peaceful in the area.

About 25 miles north of the Collins place, in the Coahuilla district, were three men who banded together, for reasons known only to themselves, to drive Collins from his home. One lived in an apple orchard, the other two were brothers and had a cattle ranch. When I went back to Coyote Creek in October, 1902, for a winter of prospecting and search, Collins had a tale of trouble to tell me.

Two of these men wearing six shooters had called on him and ordered him to leave Coyote Creek. They killed his cow and later killed one of the burros. Then they set fire to the brush fence in the night, trying to burn down the house while the family slept within.

These men asserted that one of them owned the land on which Collins had filed. At the San Diego land office John learned that the man had made a mistake in the section number when he filed and therefore did not own the land.

Soon after I arrived the government surveyors working on the Indio Quadrangle, camped near the Collins home. John became well acquainted with them and told them of the trouble. They investigated and found that a section marker had been moved a quarter of a mile. John presented this information to the county authorities who had one of the three men arrested, and a trial was set before the justice of the peace at Ballena in San Diego County.

The lawyer who was sent from San Diego to prosecute the case was the attorney for the two men not on trial, and the whole affair was a gross miscarriage of justice. When the judge bound the defendant over to keep the peace for six months, Collins remarked, "Gentlemen—you have this day laid a premium on crime."

Leaving Ballena we encountered a snow storm and the whole party including John, Mrs. Collins, the three children, three burros and myself took refuge in a farm house near Julian, owned by a man named Johnson. The snow was so deep it was a week before we were able to return to the Coyote Creek homestead.

When Collins told Johnson about the trial, the latter volunteered to get the owner's permission so the Collins family could occupy a vacant log cabin at the Ella mine situated between Julian and Banner on the old Canyon road, if they decided to leave Coyote Creek. But Coyote Creek was their home and they did not want to leave it unless they had to.

Arriving in Collins Valley a scene

of desolation greeted us. The house, wagon, and my tent, had been burned to the ground. It was evident three separate fires had been started, and the tracks in the soft ground left no doubt that it had been done by the man who was under bond to keep the peace. We were certain of this because the horse usually ridden by the man had a deformed foot, requiring a special shoe, the track of which could be readily identified.

I advised the family to leave, since it appeared unlikely that we could expect any protection from San Diego County authorities. John drove back to Julian and arranged to occupy the cabin which Johnson had secured for him.

Then he returned with the wagon to pick up what few possessions were left at the homestead. He was able to sell his pigs to Mr. Vandeventer who ranged cattle further up the creek. The creek road had been washed out so it was necessary for him to pack his 28 hives of bees and the few chickens he could round up two miles on the three burros to where the wagon had been left. He was a skilled packer and I never knew a man who could throw a more expert diamond hitch.

The Indians did not want John to leave, and Segundo offered to rebuild the cabin and guard it for six months if he would stay. But John felt that the lives of his family would be jeopardized if they remained, for he would be away on prospecting trips much of the time.

I remained with the Collinses in their new cabin home for six months, and John and I made numerous desert trips from Banner.

The family remained there for several years and then moved to Signal Hill at Long Beach.

We did not find anything of value on our prospecting trips, but I learned much about the desert, and it had a fascination for me which has resulted in my return to the Borrego country at every opportunity.

Tom and John, Jr., the two Collins boys, are still living. The latter's daughter married a ranger and they reside not far from the log cabin at the old Ella mine.

Today, many people wonder how Collins Valley got its name—and this is the story of the unfortunate family which sought to establish a permanent home there—and had to leave because they came to the frontier when it was still beyond the range of the laws which normally protect American citizens.

Winter Rains Needed to Assure Wildflower Display This Season . . .

Prospects for a lavish showing of wildflower color in the desert areas this season are not too promising according to early reports from *Desert's* Southwest correspondents. However, these reports from various sectors of the Southwest were based on a December survey, and are not a conclusive forecast of what may be expected. Generous rainfall in January would completely alter the situation.

"The desert is very dry, the plants are brittle and no wildflower sprouts are showing yet," reports A. T. Bicknell of the Casa Grande National Monument at Coolidge, Arizona. Bicknell adds that his area had a very rainy summer, but only a trace of rain since September.

Jane S. Pinheiro of Lancaster, California, tells much the same story for the Antelope Valley in the high Mojave Desert. Despite the moisture shortage, however, Mrs. Pinheiro reports that the Antelope Valley always has wildflowers although the great masses of color occur only occasionally and unless the rains come in January, they will not occur this spring.

Also from the high desert, where the flowering season starts about a month later than on the Colorado Desert, comes word from Samuel A. King of the Joshua Tree National Monument. He reports that the area has had above normal precipitation for the year and some protected perennials have come into flower during December. January precipitation will be needed, however, for a fine spring display.

"There has been practically no rain this fall, except for one light shower in the north end of Death Valley, and no sprouts are showing," writes Fred W. Binnewies, superintendent of the Death Valley National Monument. "If no rain is received in January, then the outlook will be poor indeed."

At Lake Mead National Recreation Area the situation is the same. Writes Park Naturalist O. L. Wallis: "So far we have had little moisture this fall—the weather has been relatively warm — actually it has been shirt-sleeve weather! During February our wildflowers, especially the brittlebush, begin to bloom down along the Colorado River and Lake Mohave portions of the Lake Mead National Recreation Area. Generally the blooms at the higher elevations come a few weeks later, but, we will have a better idea of the wildflower situation after January."

John G. Lewis of the Saguaro National Monument at Tucson, Arizona, is of the opinion that "the wildflower picture appears to be no better than average for the coming spring in southern Arizona. We have had excellent rainfall for the year as a whole, but most of this came in late summer and has long since been absorbed or evaporated. A good rain that fell in early December has pretty well dried up now and the weather has been warmer than normal and very dry. There are no wildflower sprouts showing yet." But, by way of compensation, Lewis reports that if the warm weather continues, the ocotillo may send forth its blossoms in late February.

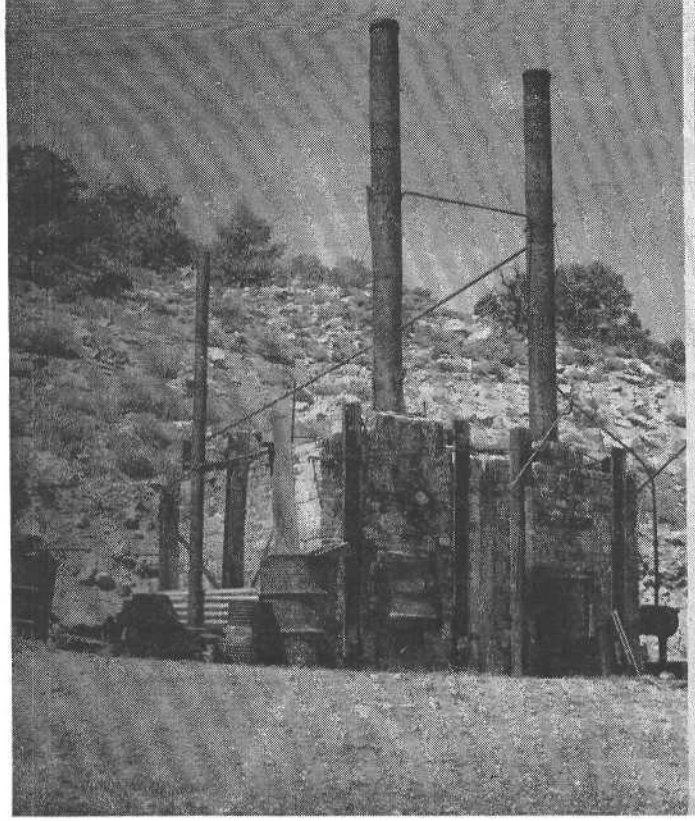
And the dry and warm situation prevails in California's Coachella Valley. The record storms that hit northern California around Christmas time failed to reach the desert.

DESERT FLORA RECOVERY ABILITY DISTINCTIVE FACTOR

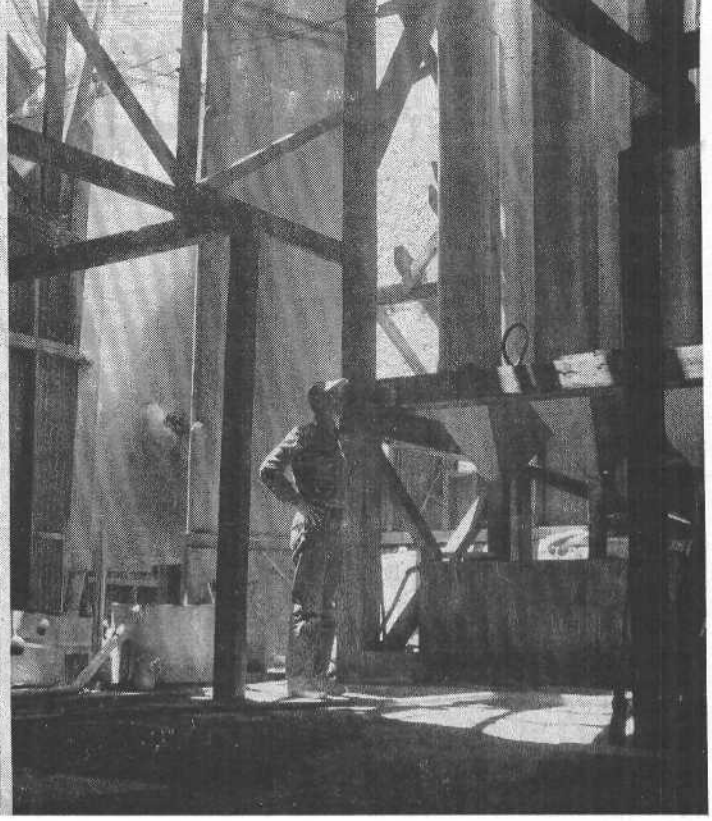
The chief distinction between desert plants and those of moister lands lies not, as we are lead to believe, in their ability to get along with scant amounts of water, but in their power to endure long-continued wilting and to recover from it unharmed when the rains come again.

Creosote bushes near Bagdad on the Mojave Desert stood through the long drouth of 1909-1912 when for 32 months not a drop of precipitation was recorded and the interval between effective rains was still longer. They came to the end of the dry period with scarcely a leaf left—as miserable a lot of plants as one ever saw. How they ever became green again is little short of a mystery.

Desert plants are great drinkers and almost reckless spenders of water when they can get it. In fact, in many cases, they appear to be more improvident with their water supply than plants of humid regions.—Edmund C. Jaeger's *The California Deserts*



ANTIQUE two-pipe open-hearth furnace was built by Walter Dunnigan's father in the late 1920s.



MODERN mill equipment at the Red Rock quicksilver mine is inspected by Walter Dunnigan.

They Mine "Living Silver" From the Hills of Nevada...

After 25 years of mining mercury, Walter and Roberta Dunnigan know that you must take the good with the bad in this business of boom and bust. Their Red Rock mine is one of the few continuous producers in the nation—proof that they have learned their lesson well. And the happy years they have spent under the Nevada sun has taught the Dunnigans something else — they would not trade their isolated stretch of mountainside for the city life they knew before becoming quicksilver miners.

By NELL MURBARGER
Photographs by the author
Map by Norton Allen

WALTER DUNNIGAN'S Red Rock mine is not the most important producer of mercury in the West, or even in Nevada; neither is it the largest or deepest or oldest mine, nor is its ore the richest. Yet, I consider it a very remarkable institution.

So far as I have been able to learn, it is the only quicksilver property in Nevada that has produced continuously through high prices and low for the past 30 years—and all this time under the same family ownership. In this day of fast profit and quick turnover, this latter fact alone is enough to make it an outstanding mine.

Walter and Roberta Dunnigan knew little of the mercury business when they arrived at Red Rock. They were lifelong city dwellers. Tall, red-haired Roberta had been employed for nine years in the auditing department of Montgomery Ward & Co., at Oakland; and Walter was a 13-year employee of Union Oil at Oleum, California.

Walter's father, George Dunnigan, was responsible for their conversion to mercury mining. He was known as "a good man with mules," and had engaged in teaming supplies to Tonopah and Goldfield, Nevada, during their great boom days. As the booms subsided and railroads replaced the freight lines, the elder Dunnigan began roaming restlessly from one mining camp to another. Shortly after World War I he drifted to Fish Lake Valley in Esmeralda County. There he obtained work on the old Patterson ranch.

Although he was not a prospector, the elder Dunnigan spent much of his free time prowling idly through the nearby hills and canyons, and one day came up on an unusual formation a mile above the mouth of Dry Canyon on the east flank of the White Mountains. It reminded him of formations found near the Knoxville and Manhattan quicksilver mines in Lake County, California, where he had been employed in his youth.

Suspecting he had found a good mercury prospect, the old boomcamp teamster staked claim in 1927 to what has since become the Red Rock mine. And scarcely had the dust settled from building the location monuments when he began urging his son to quit his good job, come to Nevada, and help develop the property. Three years later, with considerable reluctance, Walter yielded to his father's entreaties, but Roberta still was not convinced that quicksilver mining held

promise of a secure future. She continued working in the city until 1932 when she followed her husband to Red Rock. She applied her nine years of auditing experience to the assorted problems incident to living in a small rock cabin, cooking, washing and keeping house for Walter and his father, hauling all domestic water from Chiatovich Creek in the next canyon, and driving 75 miles over unpaved road to the nearest town for supplies.

After the death of George Dunnigan, Walter and Roberta had no obligation to remain at the mine. They were free to go back to Oakland, to their old jobs and old friends and the life they had known in the days before Red Rock. But, by then, it was too late. They had become quicksilver miners and Nevadans. The prospect of ever returning to the city was frightening.

In the 25 years since Walter Dunnigan moved to Red Rock, it has lost some of its remoteness, but is still isolated enough to satisfy almost anyone with a hankering to "get away from it all." Dyer, the nearest postoffice, is 30 miles away; Tonopah, the closest town is 76 miles away; and Goldfield, the county seat, is 102 miles distant. In each case, the last leg of these journeys lie over an unpaved mountain road that climbs more than 2000 feet in 10 miles, and lifts the traveler from the glaring heat and greasewood-covered flatness of Fish Lake Valley to the cool, bracing air of Inyo National Forest. There, in the pinyon pines and junipers at 7115 feet elevation, the Dunnigans have their attractive frame home, electrically lighted by their own power plant, and complete with modern plumbing.

"We still have to haul our water from Chiatovich Creek, but it isn't too big a chore," says Roberta. "We haul it in a 100-gallon tank, mounted on the back of a Model A Ford truck and a couple of trips each week supplies all our domestic needs—including the modern plumbing!"

The water from a small spring, too mineralized for drinking or cooking, is piped down the mountain a distance of two miles for mining and milling operations, and to irrigate a 100 square foot garden plot. Here the Dunnigans produce practically every vegetable adapted to the short growing season imposed by this northerly latitude and high elevation. Neither dry beans nor winter squashes, they have found, will mature; and sweet corn, although tasty, forms only very small ears. But, except for a few such crops, the roster of their garden reads like the index of a seed catalog, and provides a large portion of their annual food needs.

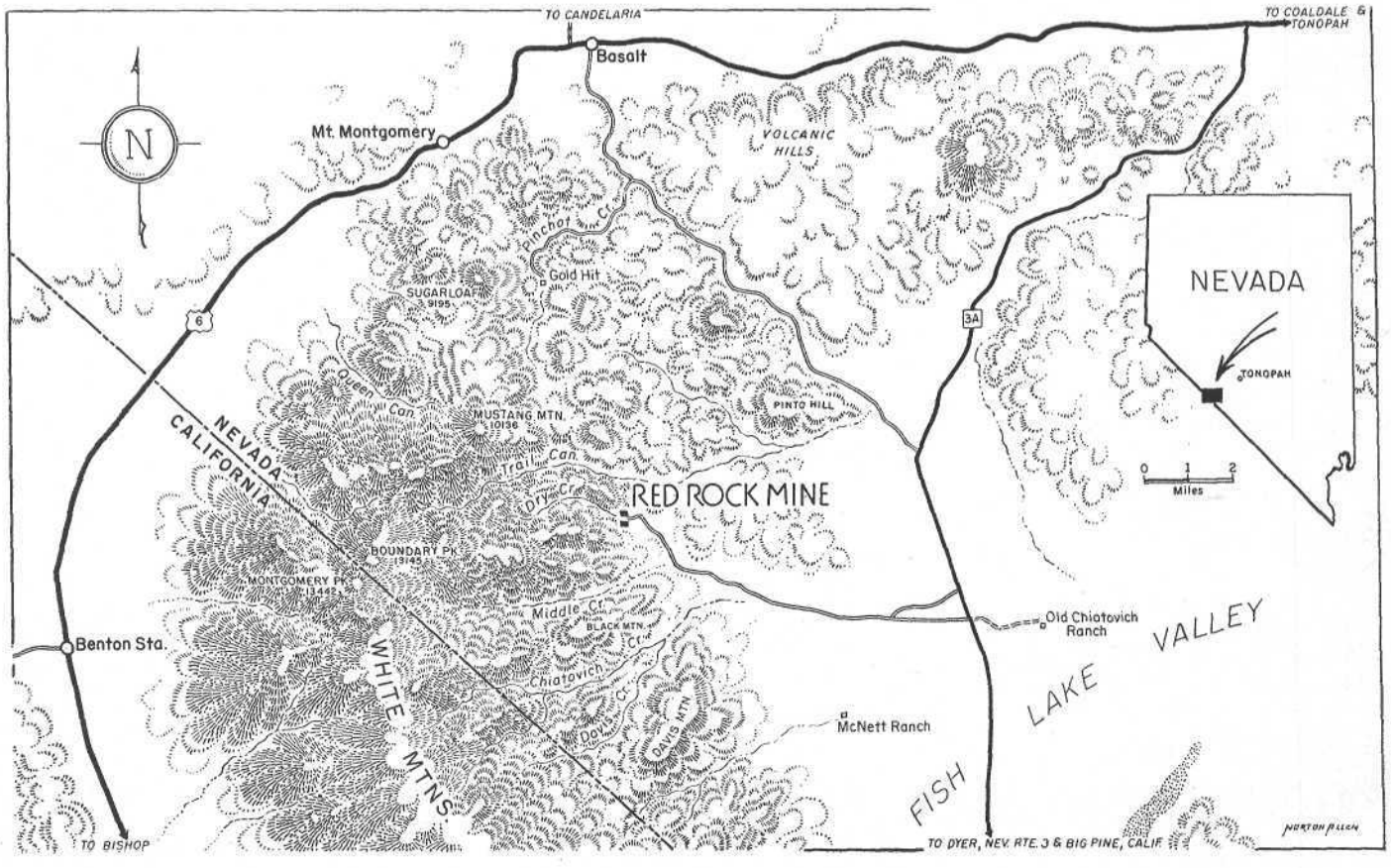
Enthusing to the self-sufficiency of the Dunnigan place, I suggested they likely could get all the wild game they needed for meat. Roberta nodded.

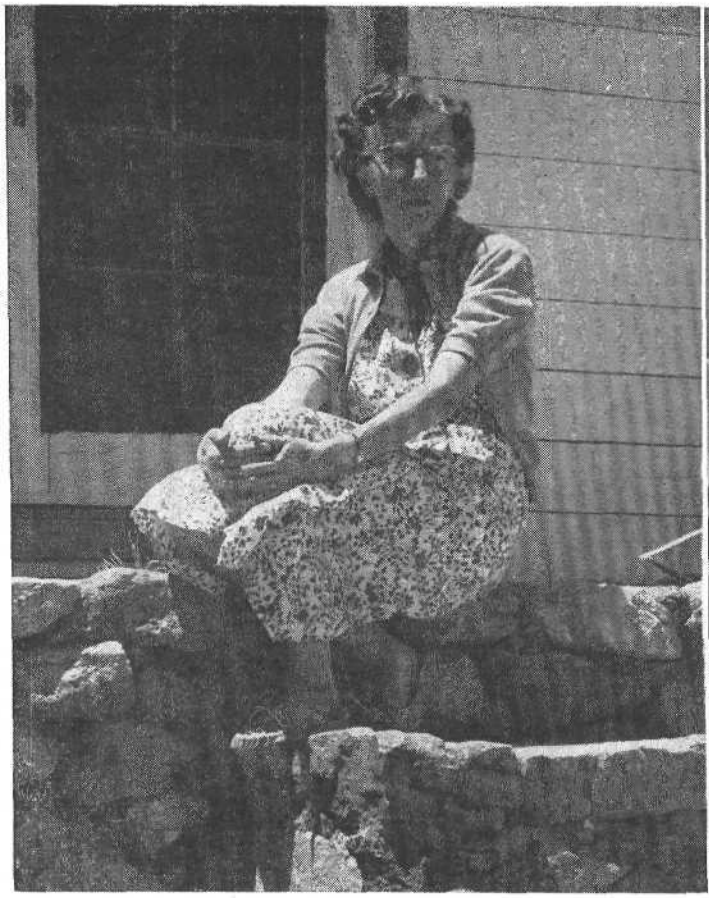
"Yes, that's true. We wouldn't have to buy a penny's worth of meat—but we never kill anything. Maybe it seems a little silly—since the canyon abounds in deer — but we've never killed one in all the 25 years we've lived here. We'd rather make friends with them, even if it meant going without meat altogether!

"We make pets of all the wild things—even the skunks!" she laughed. "Last winter a little civet established living quarters under out kitchen floor. We could hear him bobbing around and playing under there, and he would take the food we put out for him. He was a real gentleman—a harmless little neighbor. We were looking forward to the time when he would take a bride and raise a family; but when spring came, I guess he thought he no longer needed the protection of our house for he returned to the woods. We're wondering if he'll come back to us again this winter."

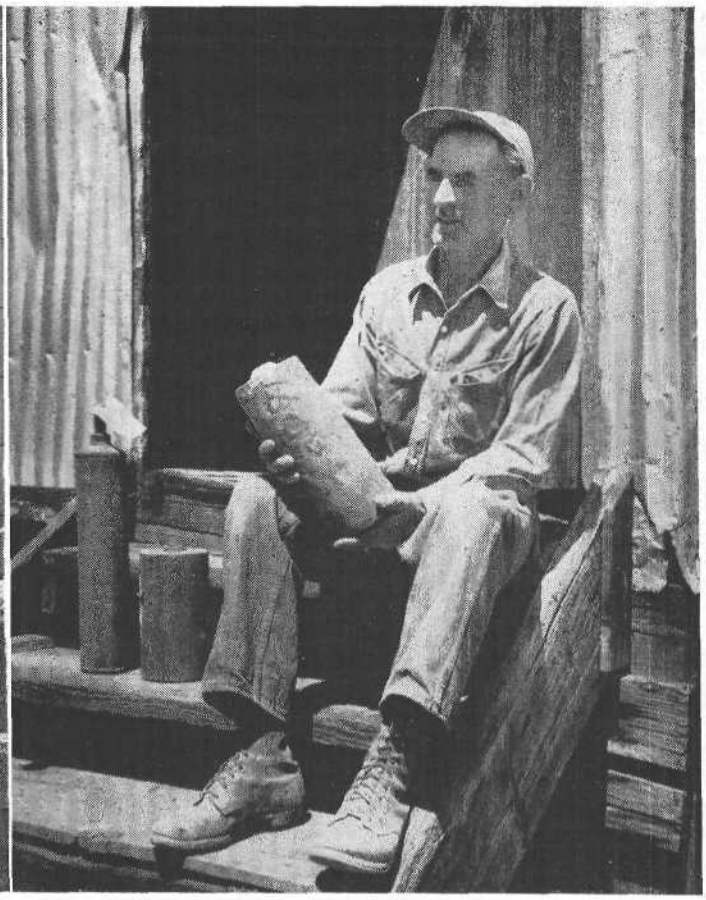
The Dunnigans are rockhounds and have an elaborate lapidary outfit, built by Walter in spare moments from scrap materials, and from it has come a beautiful collection of cabochons and polished cabinet specimens. On the living room walls hang several handsome frames of agate and obsidian arrowheads and spearpoints, all collected within a mile or two of their home, and Roberta told of finding a large petroglyph-covered rock in nearby Trail canyon, where smoke-blackened caves, once the dwelling place of ancient man, are also found.

My original business at the Dunni-





Roberta Dunnigan had her doubts at first about becoming a mercury miner, but they have long since disappeared. She alternates her duties between homemaking, tending a large vegetable garden and helping out at the mine.



Walter Dunnigan holds an old hand-welded quicksilver flask from the famous Almaden mine of Spain. Tall flask on step is modern American and stubby one electrically-welded flask from Almaden. All carry exactly 76 pounds of mercury.

gans was to get a story on quicksilver mining—an annoying fact of which I was reminded every time my gaze strayed toward the south. There, across a juniper-speckled flat, lay a brightly-tinted waste dump. Back of the dump stood an aluminum-colored mill, and back of the mill rose a hillside pocked by tunnels, cuts and glory-holes, and bound by a spiderwebbing of roads and trails.

"That's the Red Rock mine," said Walter. "It's not the greatest mine in the world . . . but it's faithful. It is in its 28th year of continuous production and still going strong. Want to take a look at it?"

Riding in his 1930 Model A Ford pick-up, which Walter claims can do anything a jeep can do and twice as good, we drove past the mill and over that winding maze of roads to a point half-way up the hill where the Dunnigans' one employee, Roy Griswold, was working at the business end of an animated sluice-box arrangement Walter calls "The Jig." While he does not claim to have invented the machine, he admits having built it.

"After studying the designs of several similar arrangements," he said, "I determined the best features of each and shuffled them together in one of my own contriving."

Walter's jig is an oversized adaptation of the placer gold rockers and long toms of the early Gold Rush days. Quicksilver ore, crushed to egg size and smaller, is dumped in the top of a chute tilted at a 30-degree angle. Water, running over this crushed rock and sand at the rate of 132 gallons a minute, washes the material down the chute, meanwhile ejecting the sand and finely pulverized mercury concentrates. A shaker then carries the remaining pieces of rock and ore to the tail of the chute where each piece is scrutinized by a sorter, usually Roy Griswold, or Roberta. Pieces of rock containing cinnabar in visible quantities are removed for retorting, together with the pulverized concentrates, and the remaining valueless rock is permitted to travel over the tail of the sluice into a waiting dump car.

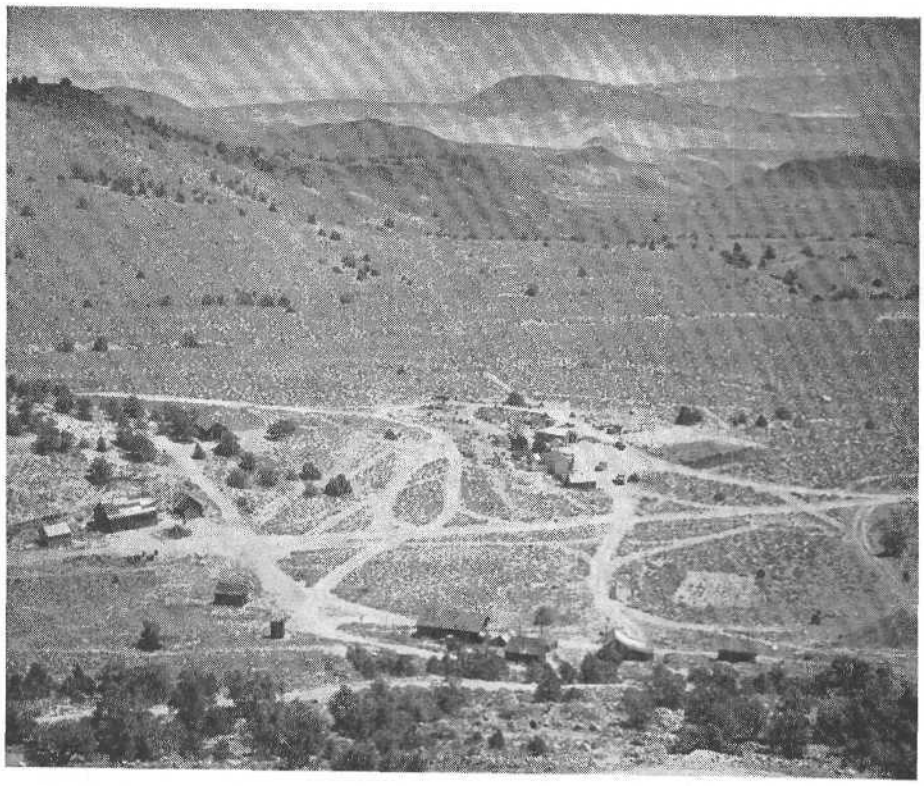
I remarked that their spring must have a good flow for them to use 132 gallons a minute to operate the machine. Walter shook his head.

"No," he said. "Actually it flows only about four gallons a minute. After the water passes through the jig it runs into a settling basin. We pump it back and run it through again and again until the water is practically worn out."

Scooping up a couple of pounds of the pulverized concentrates recovered by the sluice, Walter panned the material in the same manner placer gold is washed free from gravel. When he finished, the tail of color in the bottom of his pan showed none of the buttery yellow gold, but resembled dark iron rust, scattered through with a few small, vermilion nuggets.

These nuggets or granules, Walter explained, are almost pure cinnabar—the red sulphide of mercury — and heated to 1300 degrees Fahrenheit both they and the dark, sand-like concentrates are transformed into the shimmering, quivering quicksilver of commerce—that strange, liquid metal known to the ancient Romans as *Argentum Vivum,* the living silver.

Mercury mining, said Walter, is one of the world's oldest industries. Records of mercury production date from 300 B.C. and Romans in the time of Nero were mining the great quicksilver deposits in their own land and in



From the Dunnigan home, right center, it is 75 miles to the town where these quicksilver miners buy their supplies. Fish Lake Valley and Silver Peak Range are in the background.

Spain, where one mine—the Almaden —has been worked constantly for 2000 years. Awed by its lethal properties, fascinated by its many uses, and mystified by its volatile nature and its ability to change form at normal temperature, early alchemists gave to this strange metal the name of the Greek divinity, Mercury, personal messenger of the gods. Regarding the element as half natural and half supernatural, the ancients further accorded it religious significance and tied it into the cycle of life and death and creation. Not until the 16th Century, when alchemy surrendered to chemistry and metallurgy, did the true nature of quicksilver become known.

But before going to Red Rock I could have named only three definite uses for mercury — silvering mirrors, gauging temperature in thermometers, and amalgamating gold. To this brief roster, Walter added several even more important functions of mercury, such as its widespread use in pharmaceutics, electric apparatus, munitions, industrial and control instruments, and antifouling paint.

One of its newest uses is as an important component in an improved dry cell battery, developed in 1944. Chief advantage of the new battery, according to Walter, is its ability to function well in both high and low temperatures and high humidity, its long shelf life, and its much greater power for the size of the unit. Some authorities on industrial matters even have expressed the opinion that this new use in batteries will absorb more mercury than previously required by all other users combined.

From the jig we drove to the top of the hill over a series of one-way roads which began as sweeping systems of sampling trenches and resulted in disclosing several new deposits which have been worked profitably. One vein so revealed produces close to 60 pounds of quicksilver from each ton of rock—or at the current price of $300-plus per 76-pound flask, approximately $240 a ton. Due to the present system of bulldozing the ore from shallow tunnels and glory-holes, considerable waste rock is necessarily included with that from the actual "paystreak," which means the material passing through the jig runs only about .5 percent, or 10 pounds of quicksilver to each ton of ore.

The present custom of working the mine by the open-cut method has proven highly successful and has done much to offset the rising cost of labor. The older portion of the mine, developed by the senior Dunnigan, is entirely underground, comprising 4000 feet of tunneling.

As we stood at the highest mine workings on the brow of the hill, we were almost directly over the Dunnigan camp, which with its maze of looping roads, sheds, power plant, machine shop, and sundry other buildings, had the appearance of a small community rather than the home of only one man and his wife. Leading away to the right of the buildings, our eyes could follow the winding course of the little mountain road as it left the cool pinyon belt to spill down the sage-grown fan toward the flatness of Fish Lake Valley, at whose northern end lay the dead white lakebed where Nevada's borax industry once had flourished. Still farther to the east, rose the Silver Peak range, whose rugged heights, on this mid-July day, carried only a fraction of the snow that lay on the 13,145-foot crest of the White Mountains at Boundary Peak, only half a dozen miles to the west.

Driving back down the hill we passed the two-pipe open hearth furnace built by Walter's father to free the liquid mercury from the ore, and continued on to the modern plant where the Dunnigans now accomplish this far more efficiently and with much less risk to health than was possible under the more primitive method.

Equipped with a 30-ton Gould rotary kiln furnace, the present plant transforms raw ore into molten quicksilver in 30 minutes or less, and is capable of handling 25 to 32 tons of concentrates in a 24-hour shift. Costing $65,000 to install, a mill of this type is economical to operate and recovers from 95 to 98 percent of the quicksilver, said Walter. Only one man to a shift is required to oversee its operation; the Model A Ford engine that revolves the brick-and-asbestos-lined rotary kiln burns only a gallon of gasoline per hour; and the heating unit, which maintains a temperature of 1200 to 1600 degrees F. in the roasting drum, burns from seven to nine gallons of diesel oil per ton of ore in the course of 24 hours operation.

Leaving the roasted ore in the form of vapor, the quicksilver passes through a series of condenser pipes and is ultimately deposited in special containers filled with water. Having a specific gravity of 13.6, the liquid mercury settles immediately to the bottom and the covering water effectively seals off the poisonous fumes which formerly presented a grave hazard to anyone who worked around mercury.

"In earlier times, the spectre of 'getting salivated' was an assured hazard of mercury mining and milling," said Walter. "Some men would get salivated after working as short a time as two weeks; others might work several years before the ill effects were first noticed. But the end was inevitable. Teeth loosened and fell out, the whole system was affected, and there was no known cure."

"Naturally," said Walter, "we use every possible precaution. Although I handle the concentrates with my bare hands, I never roll a cigarette without first washing my hands." Even the minute amount of mercury carried to the lips on a dust-smudged cigarette paper may be sufficient to plant the lethal poisoning in a man's system.

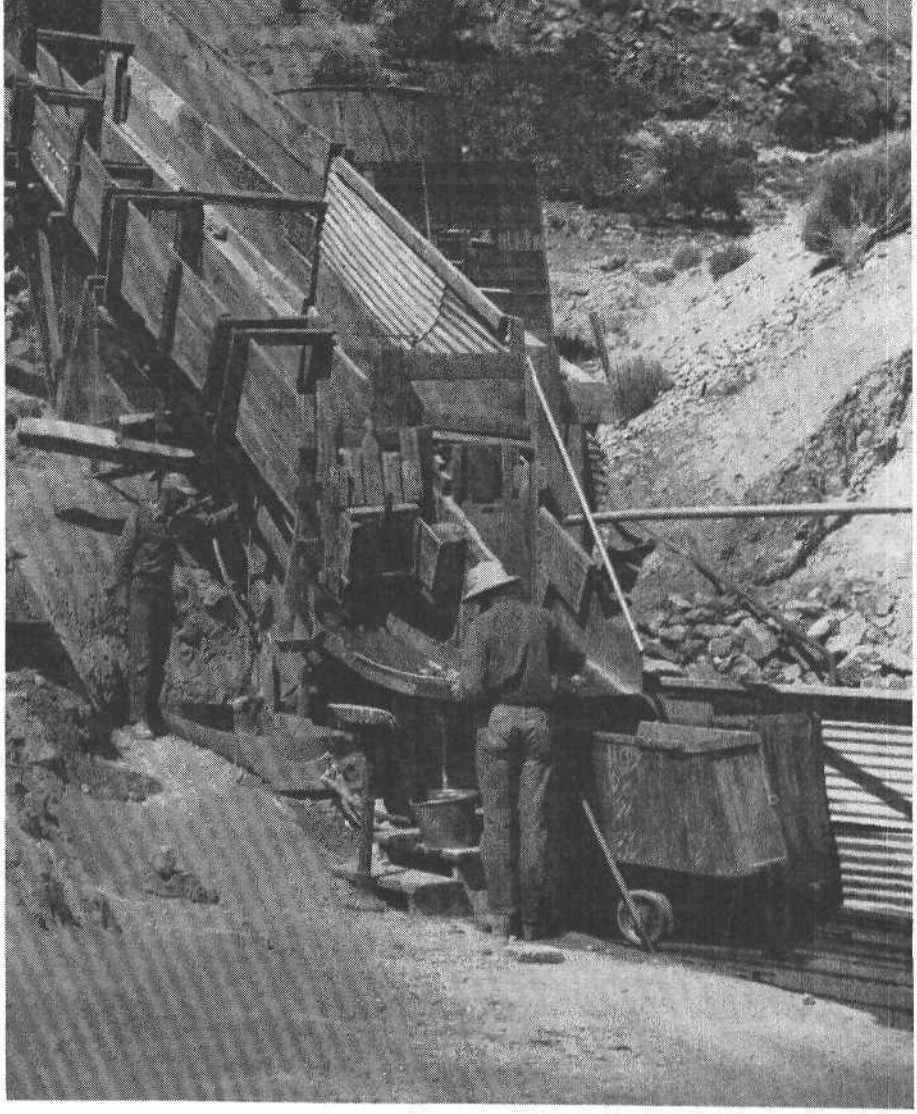
Quicksilver, in other ways as well, is a tricky commodity. Due to its great concentration of weight in liquid form it is especially difficult to transport. Back in the dim aisles of antiquity some ingenious person devised for this purpose the so-called quicksilver flask, an iron container shaped like a bottle. Evidently these vessels proved more satisfactory than any used previously and for more years or centuries than anyone knows, the iron and later steel flask has been accepted throughout the world as the standard shipping container for mercury.

Although flasks originating in different nations and from different mines show variances in quality of workmanship and design, the general shape is the same and regardless of other variances, each flask must hold exactly 76 pounds of quicksilver. The empty flask weighs 15 pounds and filled approximately 90 — an amazing weight when concentrated in a cylindrical tube five inches in diameter and 12 inches high.

Due to the fact that quicksilver flasks enjoy the common exchangeability of milk bottles and box cars, the stack of empties waiting to be filled with Red Rock mercury exhibited many variations in workmanship and design.

"When we ship quicksilver there is no assurance that we will get our same flasks back," said Walter. "Sometimes we get flasks from foreign countries. This—" indicating a neat but rather chubby container—"is a modern, electrically-welded flask from the Almaden mine in Spain. See, the name is stamped in the iron here on the end, 'Almaden, Espana.' And this crude old lunker, here, is a very old, hand-welded flask from Almaden. Whether old or new, one serves the purpose about as good as another, and all types are worth around $1.25 each."

Despite self-sufficiency in most commodities, United States' production of mercury invariably falls far short of the demand. In 1953, for example quicksilver mines in the United States produced only 14,337 flasks, or 14 percent of the 100,000 flasks required to supply the country's industrial needs. Of the imports required, some 66,000 flasks came from Spain and Italy, the world's leading producers of quicksilver for the past 20 centuries; Mexico supplied 13,637 flasks, and the remainder came from Yugoslavia and various other countries. Foreign quicksilver carries a duty of 25 cents per pound, or $19 a flask.



Dunnigan, left, and Roy Griswold at work on The Jig, a home-made device for sluicing concentrates from quicksilver ore.

Due to a combination of factors the close of World War II sent the mercury market into its worst tailspin in years, and from 1946 through 1950, the price of quicksilver on the New York market averaged less than $84 a flask. Coupled with the rising costs of labor and materials, this adverse market forced one after another of the country's quicksilver mines to close, and in 1950, according to the U.S. Bureau of Mines, mercury production in the United States dropped to its lowest point in 100 years. In that year only 16 quicksilver properties in the nation reported any production, among them the Red Rock.

In an effort to restimulate mining of this vital element, for which no satisfactory substitute has been found, Uncle Sam, in 1954, adopted a three-year quicksilver program carrying a guarantee of $225 a flask. For some strange reason the immediate effect of this price support program was to send mercury quotations soaring to the all-time peak of $340 per flask, with black market buyers reportedly offering as much as $450 to $500 a flask.

As a result of the current high prices, numerous mines have reopened, and public interest in prospecting for "quick" has soared to heights barely short of uranium.

What will happen to the quicksilver mining industry when the government's guaranteed price program ends on December 31, 1957, is something even the experts do not claim to know, and the manner in which the mercury market responds to withdrawal of federal support will likely be cause for making and breaking millionaires.

But come fair weather or foul, high prices or low, it is my guess that the Dunnigan home in the pinyon-juniper belt of Nevada's White Mountains will still be one of Earth's favored places. The soft call of mourning dove and quail will still fill the quiet air at daybreak. The rain will fall, and the sun will lay softly warm on the rocks and hills—and the little Red Rock quicksilver mine will continue to put forth its small but vital quota of *argentum vivum,* "The Living Silver."

ON DESERT TRAILS WITH A NATURALIST - XXII

Termites on the Desert...

The next time you come across a clump of bunch grass that appears to have been spattered with mud, examine it closely. Chances are a colony of termites are busily devouring the stems beneath the mud. Contrary to the widely held belief that the desert is termite-free, many species of these diligent and destructive insects thrive in the Southwest.

By EDMUND C. JAEGER, D.Sc.
Curator of Plants
Riverside Municipal Museum
Photographs by Stanley Phair

A FRIEND OF mine contemplating the purchase of a desert home asked his real estate broker for a certificate of inspection guaranteeing that the structure was free of termites or so-called white ants.

"Why go to that expense?" asked the agent. "We don't have termites on the desert. I've never heard of such pests around here."

My friend asked me later if this was true, to which question he received a very definite negative reply.

The signs of termite activity are in evidence in many places on the desert, particularly in summer after thundershowers or cloudbursts. Among the many desert oddities are the structures, really tubes of soil, which certain of these very diligent insects leave as evidence of their work on the stems of shrubs and grasses. Some stems of bunch grass are almost completely covered with saliva-moistened soil so that they appear to have been spattered with gravy-like mud. The termite toilers, working day and night, devour most of the enclosed grass stems, leaving the mud tubes intact. The insect responsible for these strange shelter galleries is the Arizona termite, *Amitermes arizonensis*.

Watch for such termite work on your next desert walk. These highly specialized social insects mud cover not only grass and shrub stems, but also the fecal droppings of animals and pieces of fallen wood from trees.

Break open the fragile earthen tubes and perhaps you will see the slow-moving insects busy at their work of devouring the dry plant materials which constitute their only food. Most termites are able to utilize this woody material as food only because they harbor single-celled protozoan parasites in their intestines which pre-digest the cellulose. Strangely enough, the Arizona termite needs no such food predigestors.

Other light-shunning white ants work in dead wood of desert trees and shrubs and in the wood of houses where there is a bit of dampness. These do not mud cover their food. They live and thrive in the dark galleries they build within the wood.

One peculiar species I sometimes find in wood has, unlike others, black legs and appropriately is called the black-legged termite.

All species have social caste systems. The majority in the colony are usually white to tan bodied, wingless workers; others are big, brown-jawed soldiers; a few are queens, given over to egg laying.

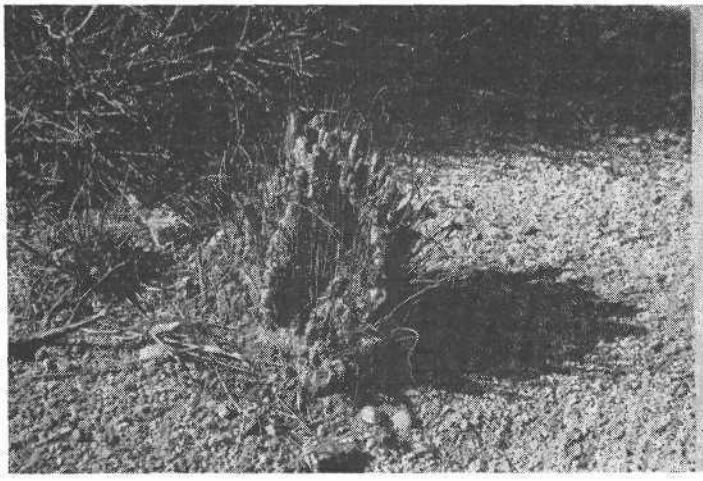
Examine the next termite colony you find and note these different kinds of individuals and their major and minor differences with the aid of a magnifying glass — something you should always carry on your desert walks.

By diligent search you may turn up three or four different species in a single day. Each is identifiable by peculiar structural differences and colors of the members of the colony as well as by the kinds of galleries they work in.

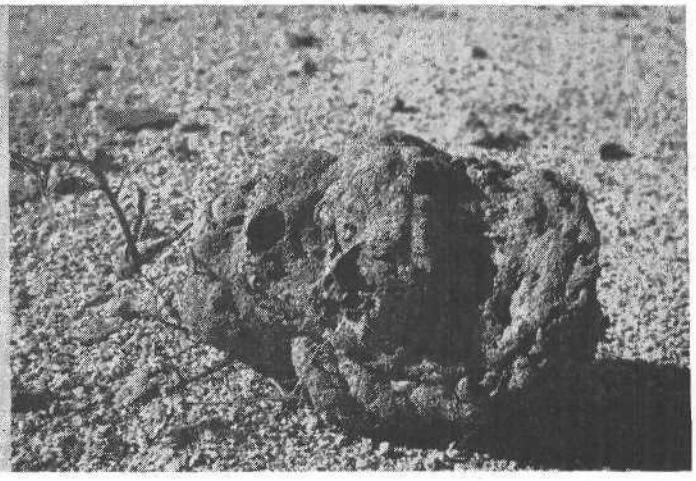
I suggest you take some notes and make a few drawings, no matter how crude. It is in this manner that you impress on your mind the things you see. Moreover, by sketching the insects, you are better able to note small similarities and differences you would otherwise never notice.

The Sahara and other deserts have termites which build mud galleries and sand tubes very similar, if not identical, to those made by termites on our American deserts. Some of the sand tubes they build are unusually large, constructed by termites called *Psammotermes* (Greek sand termites or woodworms) by the scientifically-minded specialists.

The mud galleries of desert termites on bunch grass.

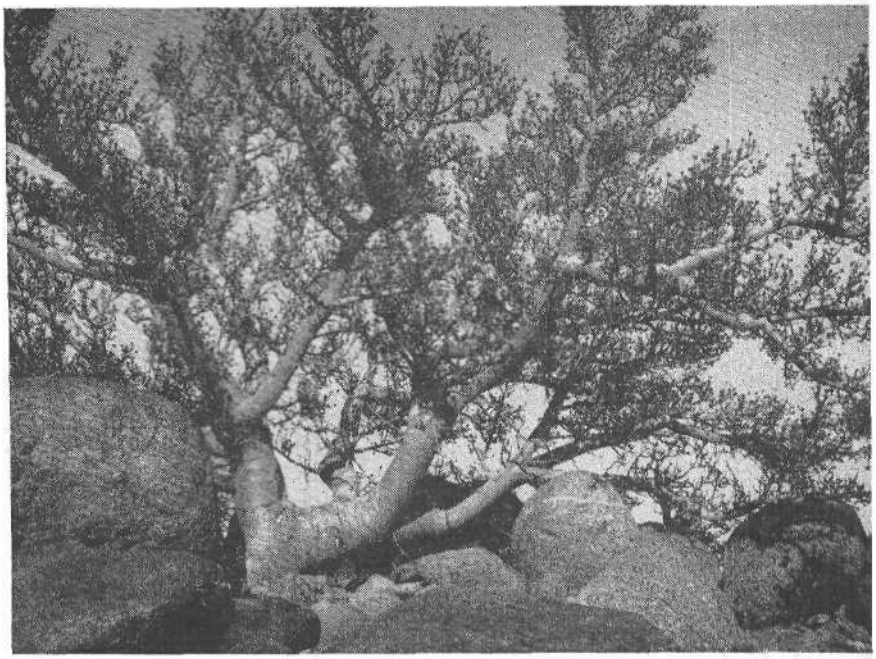


A lump of vegetable refuse mud-covered by termites.



The Vallecitos' Strange Tree

Here is a tree that starts off to be a colossus and ends up a dwarf. The result is a curious plant that has held the interest of botanists and desert travelers for many years—and will continue to hold that interest so long as the strange Elephant Tree sends its short, crooked branches into the desert sky.



Massive lower trunks of Elephant Trees taper rapidly giving the stunted plants a striking appearance.

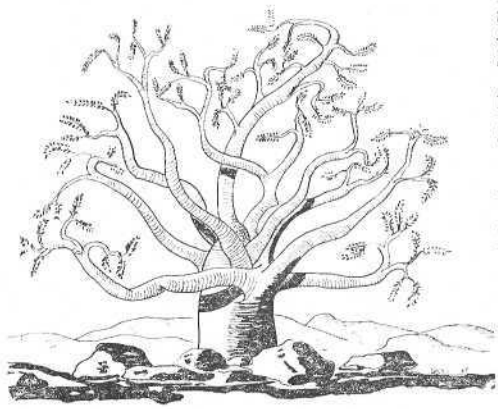
By G. PHILIP CURTI

THE STRANGE, the odd and the peculiar never fail to fascinate, and on the isolated hillslopes of eastern San Diego County, California, may be found a shrub with an elephantine trunk and blood-like sap, intriguing to both botanist and layman. Although varieties are known in the Gila Range of Arizona south through Sonora and Baja California, the *Bursera microphylla,* or Elephant Tree, has an extremely restricted distribution in California, principally on the western side of the Colorado Desert on the rocky slopes of the Vallecito Mountains. A few of the trees have been found near the base of the Santa Rosa Mountains of California.

The Split Mountain Road southwards from Ocotillo on State Highway 78 affords the only accessible route to these strange plants in the Vallecitos, but the comfort of modern transportation ends where an almost indistinguishable trail wanders westward from the tarmac, threading its way through ocotillo, mesquite and cholla. Endeavoring to avoid the boulders that increase in number and size as one approaches the alluvial fan debauching here from between two eastward-reaching rocky spurs, the path meanders with the wash it follows. At an elevation of 500 feet the trail, which may be traversed by jeep for a short way, leads into an amphitheater between the spurs and the higher Vallecito mass ahead. A trifle higher up the sloping baiada scattered over an area about a mile long from southwest to northeast, and about half as deep, amidst ocotillo with their flaming blossoms, and yellow-tipped creosote bushes—is seen the darker green of the leaves of the major stand of California's Elephant Trees.

Named in honor of the sixteenth century botanist, Joachim Burser, this unneighborly shrub does not grow in groves. The two specimens that I found in closest proximity in this group of a hundred were 30 feet apart.

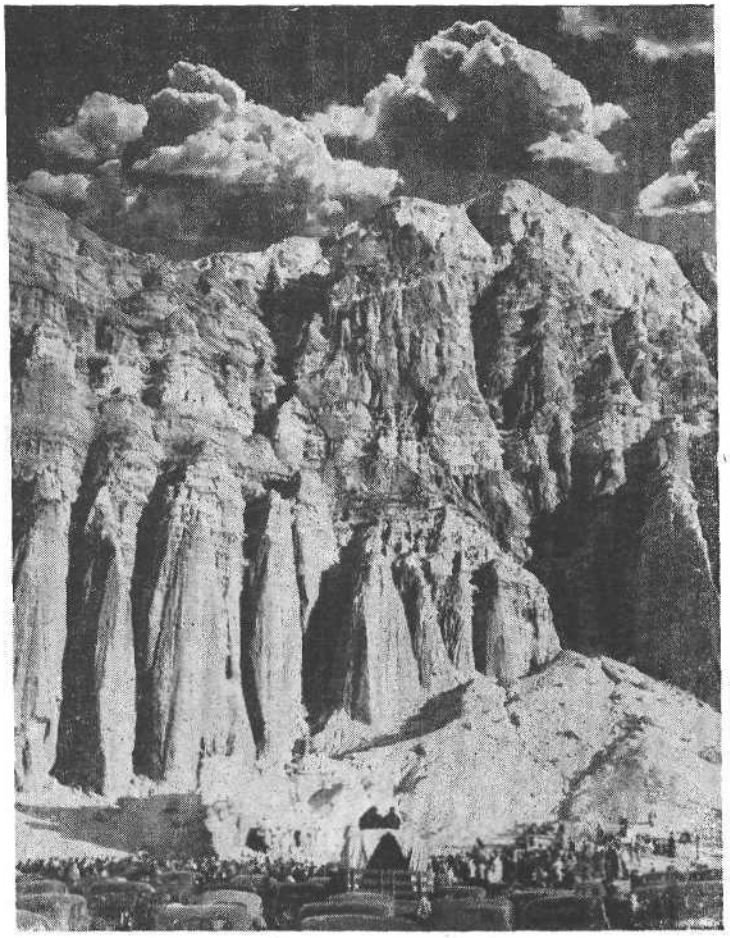
From beneath a gray boulder, the obese, foot thick trunk appears, hesitantly wondering whether this arid and desolate region would accept him in its desert vegetative association. Satisfied, the twisted elephantine trunk, within a foot of the ground, separates into two or three branches, each about half the size of the base stem. Further crooked branches taper rapidly, and the fronds of tiny green leaflets, reminiscent of the pepper tree, lend a pleasing color contrast to the yellowish green of the bark and the blue of the single-seeded berry.



Proof that this is the Elephant Tree is in the dark red sap that flows like blood when the bark is cut. The shrub will more readily bleed in summer than in winter, and the oil exuded has an aromatic smell similar to turpentine or varnish. In Mayan and Aztec times the wood was burned as incense in temples and, until quite recently, medicinal properties were ascribed to its use in the treatment of venereal disease and scorpion bites. Indians also use the bark as a source of dye and tannins.

Of all the California shrubs, surely this is the strangest: blue berries, yellow-green paper-like bark turning to reddish brown on the twigs, dark green leaflets and blood-like sap of deep red make a unique color combination. The Elephant Tree has a trunk that appears from the ground as if to bear a considerable tree, but the branches taper rapidly toward their tips. Some botanists believe this is caused by frequent freezings back in the plant's early years. The Elephant Tree ranges in height from six to 15 feet, but some 30-foot giants have been found in Mexico.

It is a shrub whose resin has been used for the healing of man's wounds and for the amelioration of God's wrath. Of a sub-tropical family of 15 genera and 400 species, but a single genus and a single species is native to California, and that, with unelephantine reserve, grows hidden in the arid rocky washes of the mountains of Vallecito.



Easter Sunrise Services at Red Rock Canyon attract an increasing number of people every year. Photograph courtesy Paul Hubbard.

Red Rock Canyon Gem Trails . . .

Rock collectors have been following the gem trails in California's Red Rock Canyon for many years—and the material is not as plentiful there as in former days. But there is more at Red Rock than merely beautiful stones, as you will realize when you read Harold Weight's story of his most recent trip to this fantastic area.

By HAROLD O. WEIGHT
Map by Norton Allen

UP IN THE Mojave Desert part of Kern County, California, efforts are under way again to convince the State Division of Beaches and Parks that Red Rock Canyon should be made a California State Park. To those of us who have known and loved Red Rock's beautifully colored, spectacularly eroded sedimentaries and volcanics through most of our lives, it seems strange that anyone should need convincing.

Of course, that isn't the whole problem. When I wrote to the Parks Division about it, they explained that this area was proposed many years ago but, "Its acquisition has not been realized, mainly because of the lack of matching funds which are necessary to assist in its purchase." These outside funds are required by the beaches and parks appropriation bill of 1945, which stipulates that each dollar spent by the state in acquisition shall be matched with another dollar from other sources or by donations of lands of equal value.

This geological and scenic wonderland is unique and unexcelled in California. In some states less abundantly endowed with natural wonders, there would long ago have been agitation to make Red Rock a national park. It is a sort of California Bryce—smaller than the Utah park, true enough, but more friendly and more approachable.

My introduction to the wonderful red canyon could hardly have been more ideal. It came in the late 1920s when we arrived among its looming cliffs at dusk, with just light enough to set up camp. Then, well after dark, a full moon swept above the easterly ramparts to half display, half conceal, with unearthly beauty and mystery, the ridged promontories and shadowed coves in the great battlements beside which we had halted. Later years revealed more but no greater beauties as my interests in desert history and in photography and in rock collecting all drew me back to Red Rock again and again.

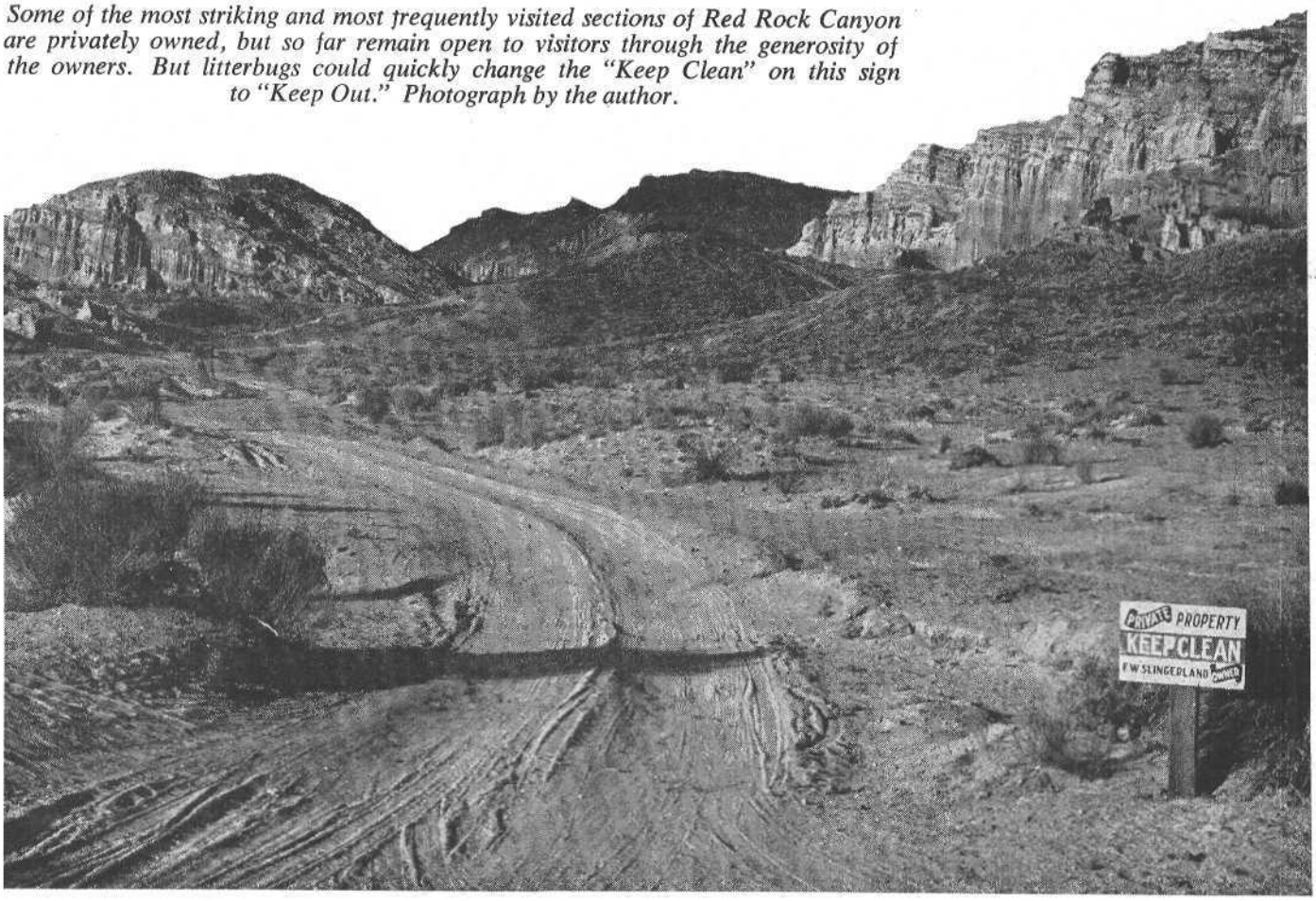
Going through some old boxes a few months back, I came upon two of the first pieces of cutting rock that I ever brought home. One was a big chunk with green and yellowish moss threads in chalcedony, the other a colorful jasp-agate in greens, browns and reds. Both of them came from Red Rock. I had found them in the middle 1930s, while spending several days scrambling over and across cliffs, mesas, buttes and gulches there.

At that period my consuming interest was infra-red photography. Red Rock's magnificent erosional formations seemed expressly designed for that film's harsh contrast and haze-eliminating, sky - darkening properties, and I gave the canyon a thorough going over. Rocks, so far as I was concerned then, could be divided into two classes—pretty and not pretty—and I wasn't looking for either kind.

Nevertheless, when I was clambering over that big backbone of Red Rock southwest of Ricardo, I found myself among rocks so outstandingly in the pretty class that for a time I forgot photography. It was a long way back to the car and I was festooned and loaded with camera and equipment so that I did not have even a free pocket. But I felt I just had to have those two special pieces, so I hauled them back in my shirt front.

About two years after that the rock fever really caught up with me. In those pre-military days, when the public domain was public, collectors could hunt almost anywhere in the Western deserts and it was several years before I worked around to Red Rock on a real collecting trip. On that trip, with my mother and father, we found that south of Red Rock a rough trace of a road led west from the highway and then northerly, to a spot behind the familiar formations. And there was abundant jasper, agate and chalcedony

Some of the most striking and most frequently visited sections of Red Rock Canyon are privately owned, but so far remain open to visitors through the generosity of the owners. But litterbugs could quickly change the "Keep Clean" on this sign to "Keep Out." Photograph by the author.



in various mixtures and colors, on the steep slopes and in the gullies which form the side of Red Rock not seen from the highway. We found cutting rocks both as float and in ledges. We also found evidence that rockhounds had been hunting and working hard around these hills and gulches for a considerable period of time.

Examining those two rocks 20 years later I was surprised at their quality. Often the "high-grade" I hauled home at the beginning of my rockhound career seemed poor stuff in later years. Wondering whether more of that grade was left at Red Rock, I recalled a rockhound gathering of a few nights before. There Red Rock had been suggested for a possible field trip. And the cry —so familiar to field trip chairmen— was "Aw, that's cleaned out!"

Rockhound collecting fields do become exhausted. Especially today, with an expanding hobby and a decreasing number of collecting areas. But the cry of "Cleaned out!" often means that a little work will be necessary to obtain good rock or that the fellow doing the hollering does not want too much competition around before he has completed his own cleaning.

While I had driven through Red Rock frequently, I had not stopped to hunt rocks there since shortly after World War II. The rockhound areas in Last Chance Canyon and the El Pasos, to the northeast, are extensive and I knew that in them petrified wood and opal, as well as the jaspers and agates of formations like those in Red Rock, were still being found. But the spot at the western edge of Red Rock that I had in mind is limited in extent. It is close beside a major highway to one of California's tourist attractions. It has been known to rockhounds almost since the beginning of the hobby. If any field was cleaned, it might well be. It would be interesting to learn how it had fared.

Red Rock is hot in summer and can be very cold in winter, when winds from the Sierras and the upper Mojave sweep down through it. Easter Week, Lucile and I decided, should be a perfect time to visit the canyon. The weather should be pleasant, the wildflowers well in bloom. We might even be on hand for the Easter Sunrise Services which attract an increasing number of people to Red Rock each year.

We arrived in the canyon the day before Easter, with the weather unexpectedly hot. Many cars and trailers already were camped against the great cliffs in the cove to the west of the highway where the services were to be held. A busy little jeep hauling a drag was racing around smoothing roads and additional camping areas for new arrivals.

The tranquillity and friendly activity of the scene was in striking contrast to the greeting I remembered in that same area when I had been picture taking so long before. On that occasion I learned in a forceful way that Red Rock was mining country. I had driven through this cove and as far eastward as a wandering trace of road would take me. There I found an interesting angle on a huge cliff I had never seen pictured before.

I fixed my camera on the tripod and composed my picture carefully, squinting frequently through the small view finder and doing quite a bit of general fussing. During this, I was dimly conscious of another car racing down the trail I had used at a clip which left great dust streamers rising into the air. But I paid little attention to it until, while I was exposing the shot, the car swerved into my side track, swung across it to block any chance of my escape, and halted.

Out of it piled a grim and authentic-looking Western character with an enormous revolver strapped to his hip. He demanded to know what in the hot desert I thought I was doing. Simply taking a picture, I explained. The Westerner snorted his disbelief and

stomped over to investigate my camera minutely.

When he came back, he seemed convinced that probably I was telling the truth. And he explained that—my camera being a very tiny one on the top of a very tall tripod — he had thought that I was surveying. And I was pointed right at one of his gold claims. And he had been having trouble with attempts at claim jumping. He had thought I was one of the unreconstructed trouble makers.

As he clambered back into his car, still unmollified, he gave me a last scowl. "You want to be careful," he warned, "or one of these days you may get shot."

I moved to more peaceful parts of the canyon. But it was a surprise to me that any mining claim in Red Rock would be considered worth shooting over. Later I learned that there had been a real gold excitement in the canyon in early days. Oldtimers say there were strikes in the 1860s. The big rush came in 1893, in this same area of the canyon. The original discoverer reportedly took out $150 in four days, went to Mojave, came back with a partner, and took out another $260 in two days. The gold was placer, hauled down to the little intermittent stream in the canyon to be worked.

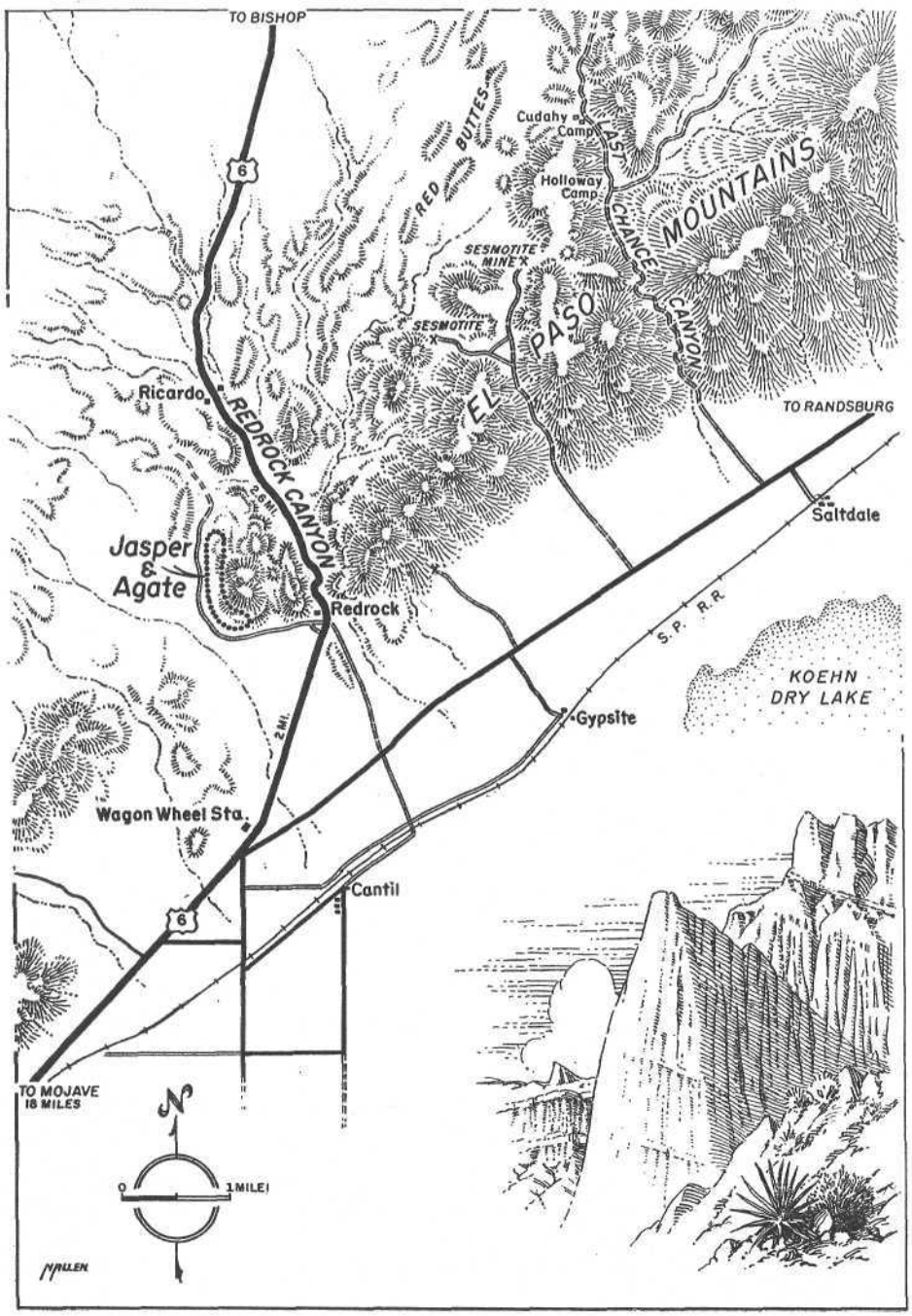
When the word got out, hundreds of hopefuls made the rush to Red Rock. But there was no water for real placer operations and the over-all values per yard made any expensive development unprofitable. Though good sized individual nuggets were found, by 1895 the California Bureau of Mines reported only seven dry-washers in operation. But the strikes at Red Rock and elsewhere in the El Paso Mountains—particularly at Black Mountain and Goler—were credited with bringing the rush of prospectors which a few years later resulted in the discovery of the Yellow Aster and the birth of Randsburg. There has been only intermittent mining since then—the most recent rush being by personnel from Edwards Air Force Base who not long since announced a uranium strike in the canyon.

With those early miners came another kind of prospector who brought the Red Rock area to the permanent attention of the scientific world. That was the geologist H. W. Fairbanks, who, in 1896, published a description of the spectacularly exposed Red Rock formations. Much earlier—in 1875—they had caught the attention of G. K. Gilbert, working on the Geographical and Geological Explorations West of the 100th Meridian, but Fairbanks gave the first details and discovered the first fossil remains in the region—leaves which were identified as belonging to the Eocene period.

Other investigations followed, the principal ones made by expeditions headed by C. L. Baker, J. P. Buwalda and John C. Merriam, from 1911 through 1915. The results were published by the University of California in 1919, in Merriam's *Tertiary Faunas of the Mojave Desert*. Merriam named the beds the Ricardo formation, for the little station and postoffice just north of the most colorful sections of Red Rock Canyon. From that Ricardo formation came quantities of teeth and fragments of fossil bone which, when patched together and identified, became what has been declared one of the largest and most important assemblages of mammalian fauna known from the Pliocene of western North America.

Apparently these creatures found their graves in a huge freshwater lake which developed in Indian Wells and Cantil valleys in the Pliocene and in which 7000 feet of Ricardo sediments and volcanics were deposited. No complete skeletons and few unbroken bones have been found in these sediments. It would seem possible that the animal population suffered from the geological violence taking place at that time.

According to T. W. Dibblee, Jr., *Geology of the Saltdale Quadrangle, California,* the El Paso and Garlock faults may well have been created during mountain-making upheaval at this period's beginning. Vulcanism which



Red Rock presents its ornate front to the public, but its comparatively drab rear yields prizes for the rockhound. Here a vein of chalcedony with white moss is exposed on a slope favored by Mojave asters. Photograph by the author.

followed, deposited huge ash beds and extruded red andesite and breccia. After a peaceful period it started again, with tuff breccia and four flows of basalt. Then, after Ricardo sediments and flows were laid down, a new and tremendous upheaval, believed a local effect of the rising of the Coast Ranges, caused thin wide flows of Black Mountain basalt, activity along the Garlock and El Paso faults, and the uplifting of the Rand Mountains.

A picture of this part of our Southwest in the Clarendonian age of the early Pliocene has been built up from the flora and fauna found in the Ricardo formations. According to the *Geology of Southern California,* recently published by the California Division of Mines, the country was a sort of early California version of the present African veldt, "a woodland-savanna association, with chaparral and some arid subtropical scrub nearby. Precipitation was about 15 inches yearly. Summers were hot, but winters were mild and probably frostless." Plant remains which experts identified were live oak, pinyon pine, locust, cypress, acacia, buckbrush, "desert thorn" and palm. Some of this material was found among the famed petrified wood collected in Last Chance Canyon, a few miles northeast of Red Rock, in the El Pasos.

Over the land had wandered giant camels as well as smaller versions, pronghorns, early forms of grazing horses and large browsing horses and deer. There were long jawed mastodons, rhinoceroses, saber-toothed cats, dogs and bear-dogs, with rabbits and weasels as more familiar inhabitants.

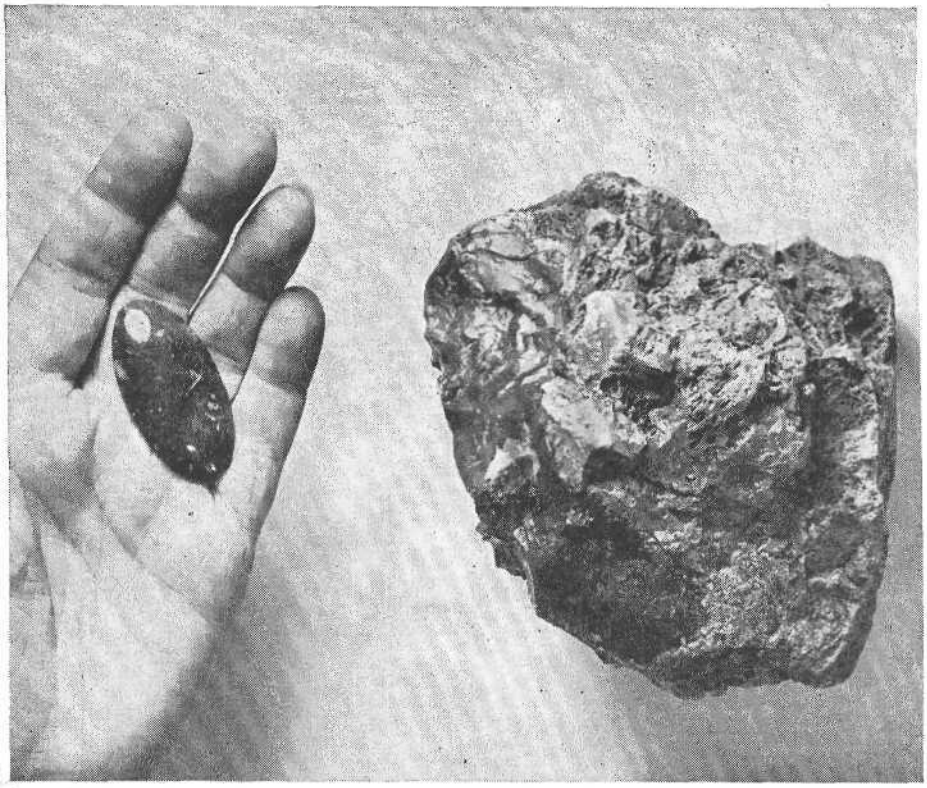
On our last trip to Red Rock at Easter-time, we found the coves along the highway occupied with campers. We sought a more secluded spot for our own campground, and turned west on the old trail I had followed many years ago.

In a matter of minutes the desert closed in around us. There was no other car or human in sight and only an occasional heavy thunder to remind us of the nearby highway. Beautiful clumps of beavertail were blooming on and near the slopes. Pincushion, pale sand verbena, small and medium blazing stars, cream and yellow evening primrose, chia, malacothrix and the pink stars of the canchalagua brightened the land around us. On the nearby slopes I found yellow and brown jasper, little seams of chalcedony, small natrolite nodules.

We followed the curve of the hills to the north, crossing a sandy wash. In the wash was a cattle fence and gate which I did not remember from my last visit. But there was no "Keep Out" sign on it and we judged it was to keep the cattle in rather than us out, so we passed through, closing the gate as we had found it. There are no spectacular cliffs at the back of Red Rock, but we were close beside small dark hills. Among them we found chalcedony, including veins of clear with mossy white at the edges. We found jasper, some of it with green moss. I picked up one large geode. There was a scattering of banded agate.

There were even more flowers here. The almost bare white limbs of the Indigo bushes on the steep slopes were sprouting beautiful purple peas. On the slopes over which we scrambled were little pink globe mallows, tiny pink gilias and lavender gilias, blooming white Rafinesquia, thistle sage and Mojave aster.

We continued on the narrow, deeply rutted road, rounding the massive slopes which enclose Red Rock's familiar formations, and angled east again. Here we searched over a great reddish slope which, I was sure, was the very one where I had picked up my first pieces. And to prove it, I



Brown, green and red moss jasper, threaded with chalcedony, from the Red Rock Canyon rock fields, and a cabochon cut from it. Photograph by the author.

found material which seemed to match exactly the two chunks I had hauled home so long before. We came upon other scattered pieces of jasper in greens, tans and browns, some red flecked. Some, with moss patterns, would cut into beautiful stones.

And we were satisfied, again, that the cry of "cleaned out!" certainly did not apply to this field. True, the material was not as abundant as it had been. Probably it had been pretty well high-graded of its finest material. But good pieces still could be found, more was weathering out all the time, and more could be dug out.

We collected until dusk, then turned back. With the Jeep we could have followed the road on through to a junction with the highway above Ricardo, but we had no desire to camp in the crowded main part of Red Rock. Instead we found a little cove in the hills at the edge of the big wash. Darkness fell shortly after supper, and with it a pleasant coolness. But sleep came slowly, with snatches of our conversation recurring, conjuring up the struggling weary remnants of the Forty-niners who had escaped Death Valley and made their way through these bright canyon walls, of the bandit Vasquez thundering through after a raid on the stage station farther north.

We watched Easter Dawn from our bedrolls and when the first light warmed the rich red of the andesite above us, the owls were still calling questioningly from the dark coves of Red Rock. The nearby canyons became alive with the varied warble of the finches. Doves spoke softly from the wash below. The early light spilled on down the slope and illuminated a little wild garden of globe mallows as the small dawn wind made them dance and tremble. On a green ledge already warmed by the sun, an early-rising gridiron-tailed lizard pumped himself up and down, genuflecting toward the east. The sun cleared the ridge and across the wide wash a mockingbird broke into clear, full-throated music.

Bathed in the beauty of those golden notes and in the ever-renewing promise of the desert dawn, I felt a twinge of sorrow for the rock collector back there in the city who had cried that Red Rock was cleaned out. Even if he had been right about the rocks, he would still have been wrong. There is so much more to rock hunting in the desert than the bringing home of a carload of rocks. And there is also, in such wonder spots as Red Rock, almost a guarantee of expanding horizons. Even as the canyon once made me forget my photography to look at beautiful rocks, it may make rockhounds drop their picks to gaze at beauty and next time perhaps they will bring cameras along.

THE Desert MAGAZINE CLOSE-UPS

"Bradshaw's Road to the La Paz Diggin's," in this month's *Desert*, is the first article written by Franklyn Hoyt for a popular magazine although several of his works have appeared in scholarly historical journals. Hoyt is a history teacher at Mt. San Antonio College in Pomona, California.

He is a native of Riverside, California, and in 1941 was graduated from the University of Redlands. After four years in the Navy, Hoyt entered the University of Southern California where he received his Ph.D. degree. His specialty is California History.

The Hoyts, who have two children, John, 8, and Nancy, 4, are camera enthusiasts who enjoy traveling to far off places for their photos.

"We are making rather vague plans at this time to drive to Fairbanks, Alaska," writes Mr. Hoyt.

* * *

G. Philip Curti, who wrote "The Vallecitos' Strange Tree" in this month's issue, is credited with making the first comprehensive study of the Borrego Springs, California, area. It was while making this study that he became acquainted with the Elephant Tree found in that vicinity.

Curti was born in San Francisco, but spent most of his life in London. During the war he was a pilot and navigator in the RAF. He is currently connected with the Department of Geography at UCLA.

* * *

New address of the National Speleological Society is 1770 Columbia Road NW, Washington, D.C., advises Dr. W. R. Halliday, author of "We Explored the Winding Stair Cave" which appeared in the December, 1955, *Desert*.

BLACK WIDOW'S VENOM MUCH STRONGER THAN RATTLESNAKE'S

The black widow is the principal spider in the United States with poison sufficiently toxic to affect a healthy adult. The poison is neurotoxic, that is, it affects the nerves.

Weight for weight, the venom of the black widow is now believed to be more virulent than that of any other poisonous animal. It is rated as six times stronger than that of the cobra and 15 times that of a prairie rattlesnake. It is indeed fortunate that this spider is so small. In 217 years only 1300 bites were recorded, with a death rate of four percent. *Outdoor Hazards, Real and Fancied* by Mary V. Hood.

Potted Plants in a Desert Patio . . .

Each desert home may become a lovely oasis if its occupants will give thought and effort to its landscaping. Where water is in short supply, the problem of growing things may best be solved with potted flowers and shrubs — and here are some suggestions from Ruth Reynolds of Tucson for those who are interested in decorating the yard or patio with a movable landscape.

By RUTH REYNOLDS

FEBRUARY IN THE Desert Southwest is half spring, half winter, and many plants in the desert garden are now in a dilemma—enticed into bloom by the warm daytime sun and chilled into retreat by the cold night temperatures. The gardener too is perplexed—tempted to get things going in the garden but aware that there is yet too much danger of freezing weather.

In contemplating this period of uncertainty I began thinking of potted plants and portable gardens. When I mentioned the idea to Ted his thoughts turned immediately to "tub toting" and who was going to do it.

"Don't worry about that," I told him. "Only a few plants require tub-size containers and the nurseries now carry dollies with which to move them. Or, why not get one of those industrial hand trucks? A small lightweight one?" I asked.

"Because," answered my husband, "we don't have any potted plants." I agreed that we didn't have—yet.

This is an increasingly popular type of gardening — a type many people consider less, rather than more, work than regular gardening. A potted garden can be confined to a concentrated area, protected from extreme temperature changes. All the work of watering, weed and insect control is reduced to a minimum and each plant can be given its own best soil to grow in and its own particular diet.

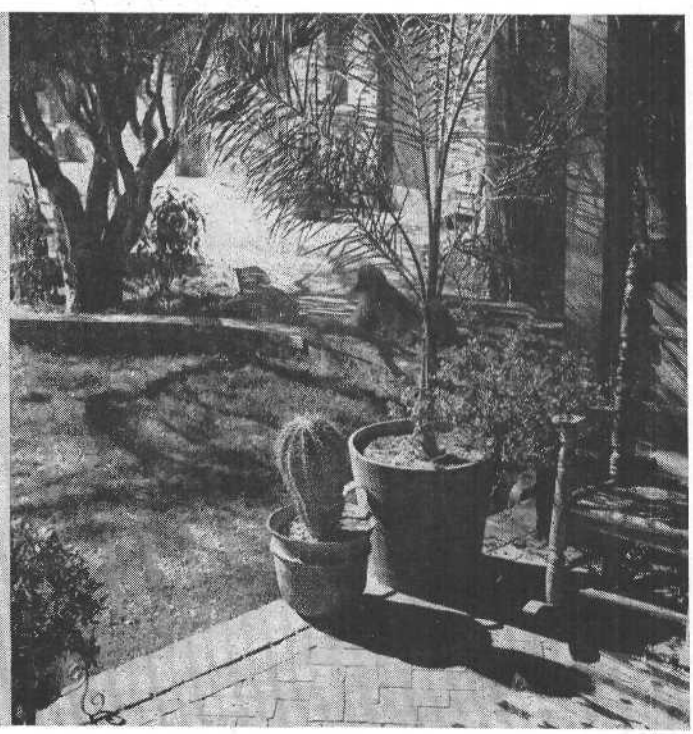
Plants suitable for potting are numerous and varied. They are divided into two main classes—those grown for flowers and those for foliage, although many plants fit equally well into both categories.

In the first group almost any flower —from the petunia to the rose—can be pot grown successfully. Even the very common African Violet or geranium can be dramatized by the gardener's ingenuity by using them in numbers and grouping them effectively for bright color accents.

In the garden I have in mind, the foliage plants predominate, and texture and form as well as color shadings are characteristics to be considered by the pot gardener, especially if she is influenced by an artist-designer-gardener like my friend, Helen Gardiner Doyle, who has turned the small patio and brick paved terrace of her desert home and art center, Hacienda Bellas Artes, into a green oasis where the native and the exotic combine to create an

Handsome carved door in keeping with the patio's Spanish motif is framed, from left, by rubber plant, fan leaf palm and sweet potato plant that could pass for a philodendron. In background is a privet tree.

Potted Saguaro and cocoa palm, right foreground, enjoy the sun at the edge of the patio walk. Palo Verde in background grows in a brick lined island giving it the appearance of being potted too.



artistic setting to be lived in the year around.

Mrs. Doyle, I must admit, has the advantage of having planned ahead for just such a display. Her husband, Luke Doyle, is a contractor and the two of them together designed and built their house. The home is Spanish in style and it encloses, on three sides, an inner court or patio where plants can be placed in direct sun, in the shade of a sheltering wall or under the overhanging roof.

The unpaved central part of the patio is in grass, and the focal point of interest there is a palo verde tree with the free-form outline of the paving reaching out to encircle it so that it appears to be potted too.

On a recent visit to this desert hacienda, 14 miles from Tucson, I found Helen unoccupied, for the moment, with teaching art, painting or designing and as eager as I to talk about plant-growing. It was then and there that I became a pot garden enthusiast, influenced by Helen and her portable garden.

The first thing that impressed me was her use of some rather common plants — a shrub sized potted olive tree, a nepal privet tree, an 18-inch high saguaro, fan leaf palms, cocoanut palms—all requiring little or no protection from sun or frost. With their roots confined, their growth had been retarded and their attractiveness enhanced.

Among plants more commonly used indoors were the jungle natives—the easy-to-grow philodendrons, including the dramatic, huge split-leaf *Monstera* as well as the more familiar vining *oxycardium*, with small heart shaped leaves; a rubber plant and a *Strelitzia Reginae* from Hawaii.

Plants more tolerant of sun but sensitive to cold are shrub-formed bougainvillea, camellias and hibiscus. All of these make attractive plants even when not in flower.

In choosing plants and arranging them an artist would of course be adept—achieving a nice balance between the tall and the low growing plants; harmonizing or contrasting the shades of green—the dull with the bright, the glossy textures with the softer or rougher ones.

Containers, according to Helen, should be in keeping with the architectural styling. The more modern the architecture, the more modern the containers. However, the pot should never outshine the plant and, obviously, should be large enough and only large enough to accommodate its root system and accentuate its best features. Helen likes small redwood tubs painted a dark, dull green for larger plants and clay pots of assorted sizes for plants of smaller sizes. Many of these pots come from Mexico.

Her gardening, after plants and containers have been selected, begins with drainage. To pot a plant she covers the holes in the bottom of the container with pieces of broken crockery, adds a layer of charcoal, then a layer of peat moss and fills in with potting soil —a large percentage of which is peat moss, except for arid climate plants which do well enough in a more compact soil. For the more acid-loving plants—bougainvillea and camellia—a little soil sulphur may be added.

Once the plants are established they are fed and watered according to their requirements.

Most thrive on a balanced fertilizer, applied in liquid form. A completely soluble fertilizer with a 10-20-10 analysis—four tablespoons to 12 quarts of water—is a good formula, higher in phosphorus than in nitrogen and potassium. In fertilizers there is a difference between soluble and completely soluble, so manufacturers' directions should be followed carefully.

How frequently a plant should be fed and watered depends upon the plant, the temperature and humidity. As a general rule a once-a-month watering with the above solution is sufficient to feed each plant according to its size and need, the larger plants in larger containers receiving more than the smaller plants. An exception to this rule is made for flowering plants which may be given double the amount of fertilizer to the given amount of water.

Each plant's water requirement must be carefully gauged. Over saturation leaves the soil waterlogged and airless. Too little water results in the obvious drying up of soil and plant.

In most small containers the soil is kept sufficiently moist with one or two waterings a week, while larger containers require water less often. When there is doubt the soil beneath the surface should be checked.

All plants benefit from an occasional washing to clean them of dust and insects—mealy bugs, thrips, red spiders —which helps keep them attractive.

At this point I persuaded Ted to read this manuscript.

"What do you think?" I asked brightly when he finished.

"I think," said my husband, "I'd better start looking around for that hand truck."

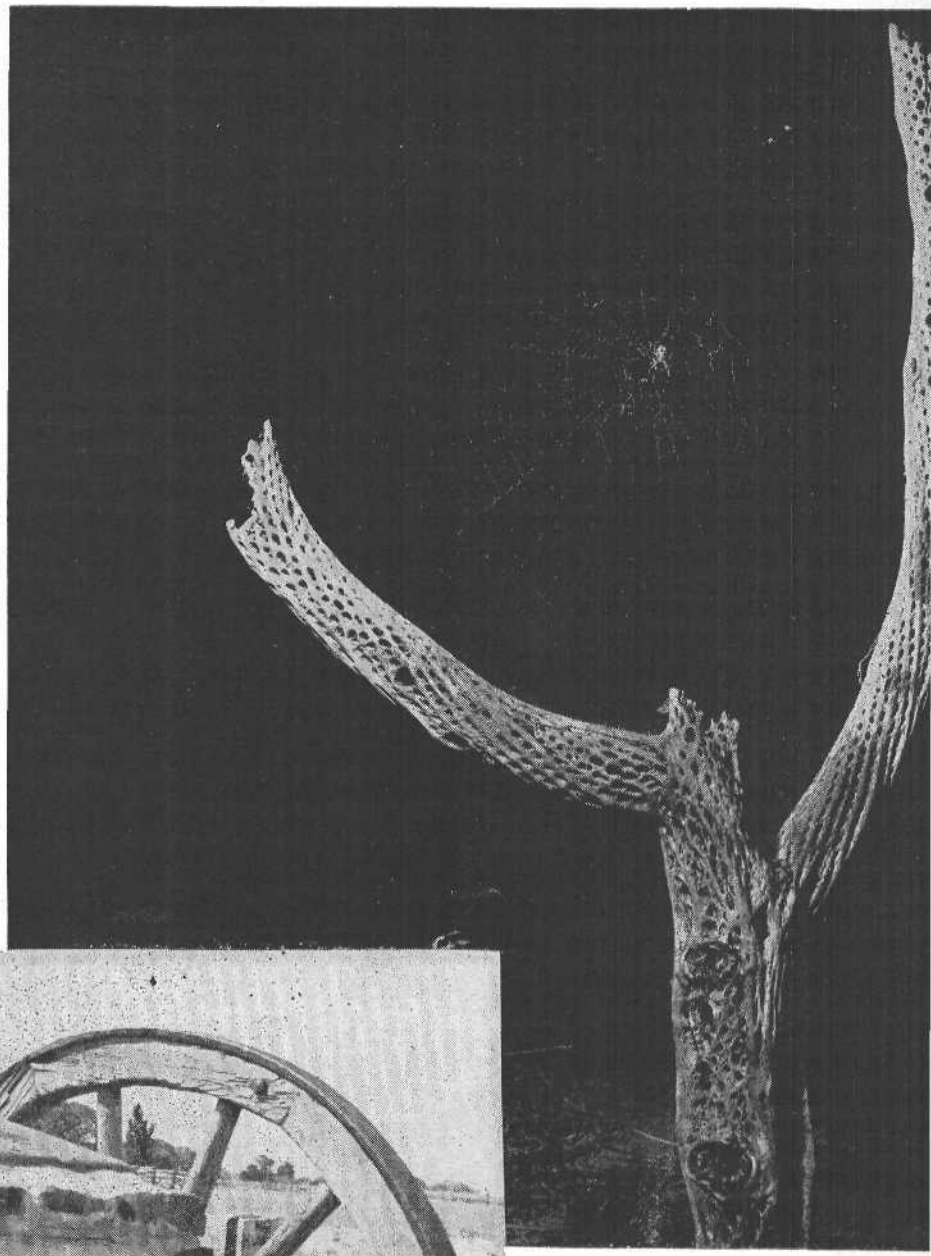
"Oh yes," I agreed. And then I had an idea, two ideas really. "You know," I said, "we could put some sort of roof over our brick terrace . . . and wouldn't it be nice if I had a little lath house—just a tiny one, where I could pot the plants and keep them until they were ready to display—"

Ted was overcome with enthusiasm, I guess, for his answer was quite unintelligible.

Pictures of the Month

Spider Web

L. D. Schooler of Blythe, California, repeats as the first prize contest winner with this striking study of a spider web stretched across the fork of a cholla cactus skeleton. Schooler used a Rolleicord camera, plus X film, flash, f. 22 at 1/50 sec.



Monument

Second prize winner is this photograph of the Ragtown Crossing Monument near Fallon, Nevada, photographed by A. L. Seeling of Santa Barbara, California. Camera data: Rolei 3.5 Xenar lens, Ansco Supreme film; f. 11 at 1/100 sec. sec.

Treasure Canyon of the Coso Ancients

Somewhere in the rugged Coso Range on California's Mojave Desert is a hidden canyon where the ancients are said to have stored a rich treasure in gold and artifacts in caves. Here is the story of the man who learned about this treasure from an aged Indian—and who believes that he once located the caves—only to lose them again.

By RUSS LEADABRAND
Photographs by the author
Map by Norton Allen

BROODING OVER the northwest corner of California's Mojave Desert is the bleak Coso Range, a grim, burned series of volcanic cones and wind-scoured crags that crowd up to an apex at Coso Peak, 8160 feet.

The Coso Range rises out of the melancholy salt flats of the China Lake country to form a wide, somber mesa. This tableland, cut by endless rocky ravines and tortuous arroyos, knows few watering places. The lonely Joshua trees stand sentinel here and the coyote is familiar with the evening ridges.

Few roads invade the Coso badlands even today and in those days of the late 1920s when Frank Bishop was prospecting the Panamints and Argus Range there were many blank spots on the map between Brown and Darwin.

This was the haunt of early man and he left his mark. The first modern explorers in the area — the single-blanket burro prospectors—often stood in awe of the vast canyons filled with the Ancients' writing.

The Paiutes who still lived in the area told Bishop that the Coso Range was a place set apart—a place that once belonged to the "old people."

Some of the Indians hinted of other things in the dark range and these stories intrigued Bishop. Indians in the Mojave, like Indians elsewhere, are not talkative. But one Indian prospector dropped a couple of references to a hidden canyon. The remark stuck in the back of Bishop's mind.

He had seen gold in the Argus Range and had reason to suspect that there was more of the yellow stuff in the neighboring hills.

Snow fell early on the upper desert that year and the gaunt, gray giants of the Sierra scarp were dusted with white when Bishop stopped off at a cabin near Brown on his way back to civilization.

The Indian prospector was inside and they spoke again of the Coso back country.

That night, before the pale light of a kerosene lamp, the Indian showed Bishop a strange necklace.

It looked incredibly old, yet the sinew stringing was still tough for it had been well preserved.

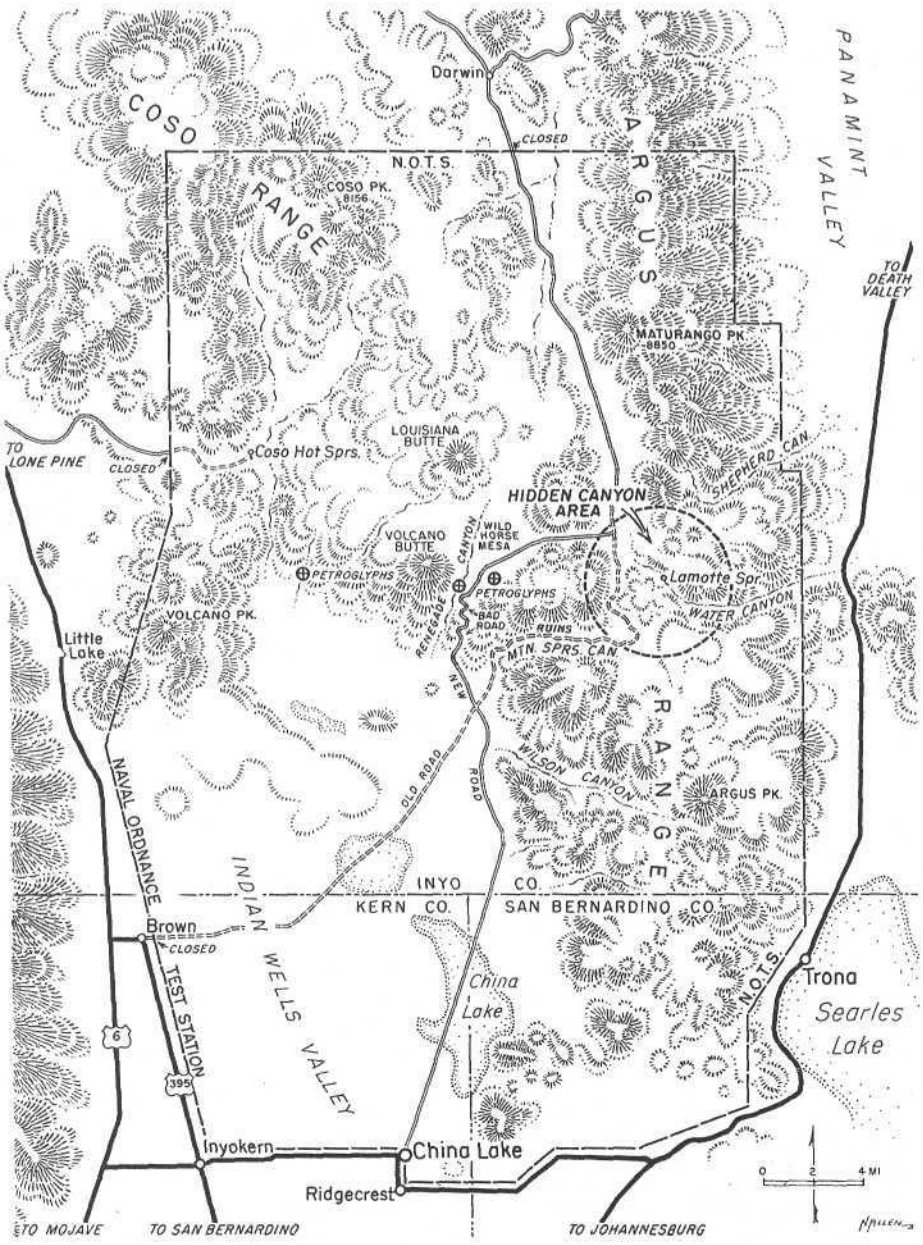
The tiny red shell beads were laced together in an overlapping pattern. Single flat beads, scarcely a quarter inch across, were laboriously pierced by some tireless ancient with a stone drill.

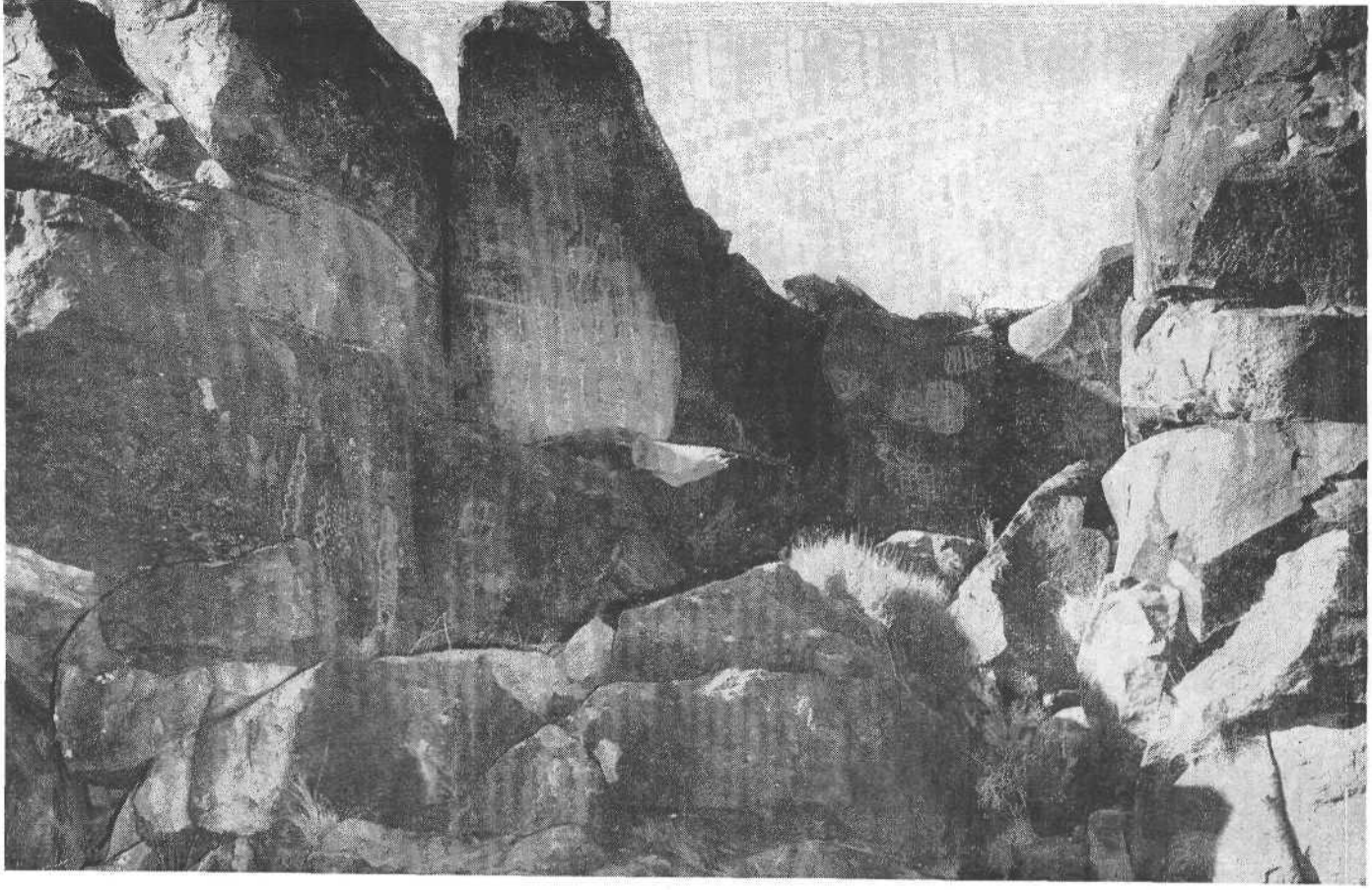
There were three pendants on the necklace. At first Bishop took them to be green-black stones—dirty pieces of tarred obsidian. He rubbed one of the stones. The grime came away under his touch.

The pendants were pierced gold nuggets, each the size of an acorn!

The Indian wouldn't part with the necklace, but in the yellow smear of light on the rough table he drew a map—a map that was to lead Bishop across hundreds of strange miles in the years to come.

It was a rough map that the Indian drew with a gnarled finger across the





It is in a rugged terrain such as this that the hidden canyon and its caves of treasure are believed to be concealed. Petroglyphs are evidence that the prehistoric aborigines spent much time in this region. At the top, Fred Morgan of Pasadena, California, who guided the author into the Coso range.

rough pine boards—a map to a hidden canyon in the Coso Range.

Within the canyon, the Indian said, were the caves of the old people. It was from such a cave that the necklace with the gold ornaments had come.

Dry caves, dust dry, where rain or wind never touched. Caves where the old people may have been buried in the strange custom of the ancients with arms and legs folded and covered with a giant basket; caves where the tools of labor and war were still scattered under the dust; caves that white men had never seen.

The map contained landmarks to a small box canyon. Entrance to the canyon was through a rock crevice scarcely wide enough to admit a man. The opening appeared in the side of a rocky ravine. Inside, a shadowy slot cut across the floor of the range. On one wall were Indian writings, the petroglyphs of the old people. On the other wall, high above the floor of the narrow canyon, were the dozen shelter caves.

The map etched itself in Bishop's mind. He took the vivid mental picture with him back to Los Angeles.

The museum people with whom he checked doubted that Indians in the area had used golden ornaments but they did not discourage Bishop. They didn't know it then but they were to discover even stranger things at Little Lake at the foot of the Cosos.

Two years passed before Bishop returned to the Cosos. In the months that followed he criss-crossed the Range and in these wanderings saw many incredible sights. Indian writings were scattered throughout the vast rocky ravines of that forbidding range.

Bishop crossed fields of glass where the obsidian shards sliced the soles of his shoes. There were alkali fields hidden in secret valleys. On the rims of these dry lakes he found the remnants of old Indian campsites. Arrowpoints and stone implements were common in these areas.

Every day there was something new and strange, but the hidden canyon escaped his search.

With summer almost spent the prospector despaired of finding the cave site. At sunset one evening he was crossing a long purple plain somewhere in the vicinity of Lamotte Springs when he noticed the dark line of a ravine on the edge of the flat.

It was in an area that he had searched before, but the distant line aroused his curiosity.

It was a walk of a hundred yards and on the way he passed a low wall of stones.

In a few moments he reached the ravine and with the last rays of the dying sun making long shadows across the inhospitable range Bishop at last looked down into the box canyon. He camped at the canyon entrance that night.

The next morning he discovered why he had been unsuccessful in his earlier searchings.

The yard-wide mouth of the box canyon, which opened into a larger wash, had been covered by a cave-in. The only way to find the canyon—little more than 100 feet in length—was to stumble upon it from above as he had done.

Bishop climbed over the rubble at the canyon's mouth and stared in astonishment at the sight before him.

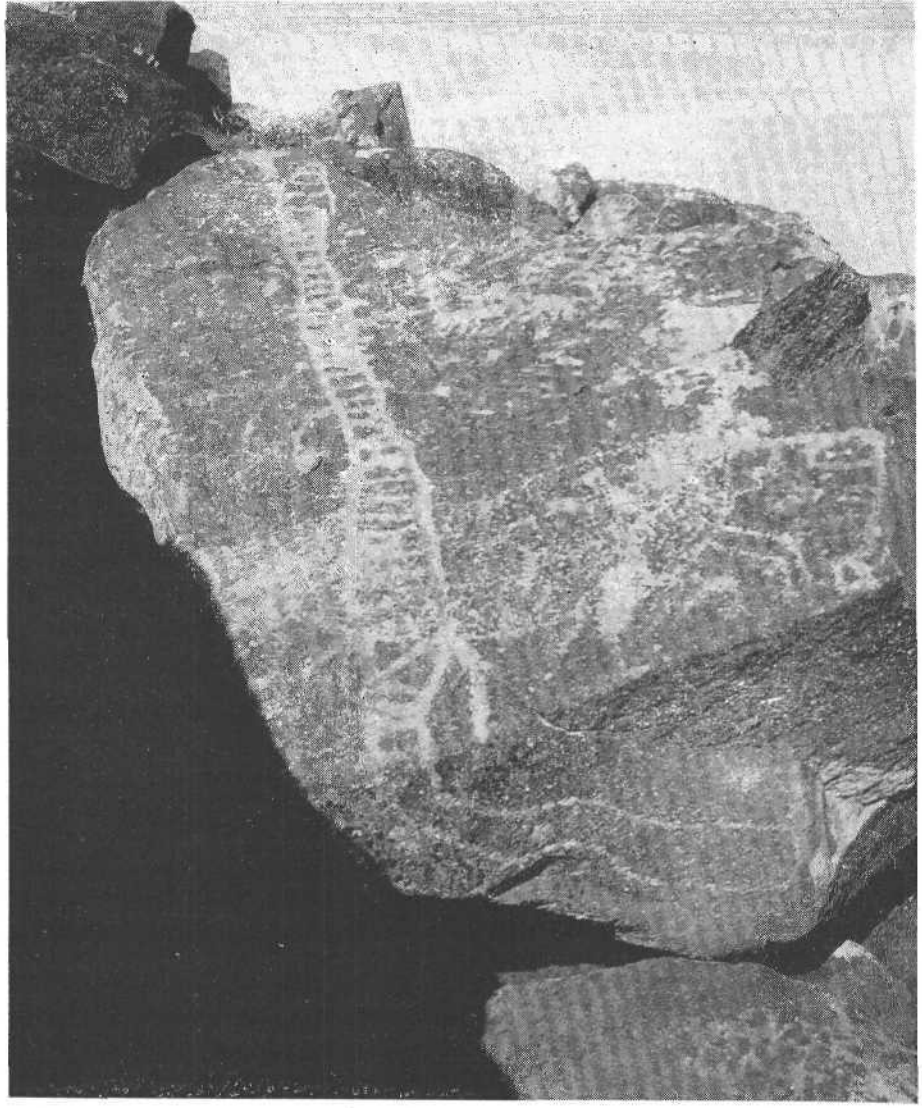
It was almost as the Indian had described it. A narrow canyon, one wall covered with petroglyphs, the other perforated with cave mouths.

The caves had obviously been used as places of habitation. Soot from innumerable fires had made great smudge smears up the sheer canyon face above the yawning holes.

But the caves were too high to reach from the canyon floor. There were handholds on the face of the wall, but Bishop could not climb up them.

Exploring the canyon floor he found obsidian points, scrapers and chips in profusion.

Later he climbed back up to the rim of the canyon hoping to reach the



Petroglyphs are everywhere in this rugged country. This glyph resembling a ladder stretches from the bottom to the top of a ravine.

caves from above, but his single piece of rope was too short to stretch down to the cave mouths. There was no way to reach them.

From the opposite side of the canyon he tried to peer into the caves. In one he saw, or thought he saw, a piece of matting or a basket.

Bishop marked the canyon as well as he could in his memory and also made pencilled notations of a gray peak on the left and a red cinder cone to the right of the canyon.

Five years passed before he returned to the Cosos. The unfriendly range had changed. The tire ruts that pass for roads in that country went in the wrong directions. The peaks had shifted. The landmarks had vanished.

Nowhere could he find the gray peak and the red cinder cone. The hidden canyon with its caves of mystery was lost again. Bishop looked for a week and then gave up.

Things have changed even more in the Coso Range since Bishop tramped over them.

The U. S. Navy has taken over most of the country for its giant Inyokern Naval Ordnance Test Station at China Lake. The old roads into the country are lost or closed.

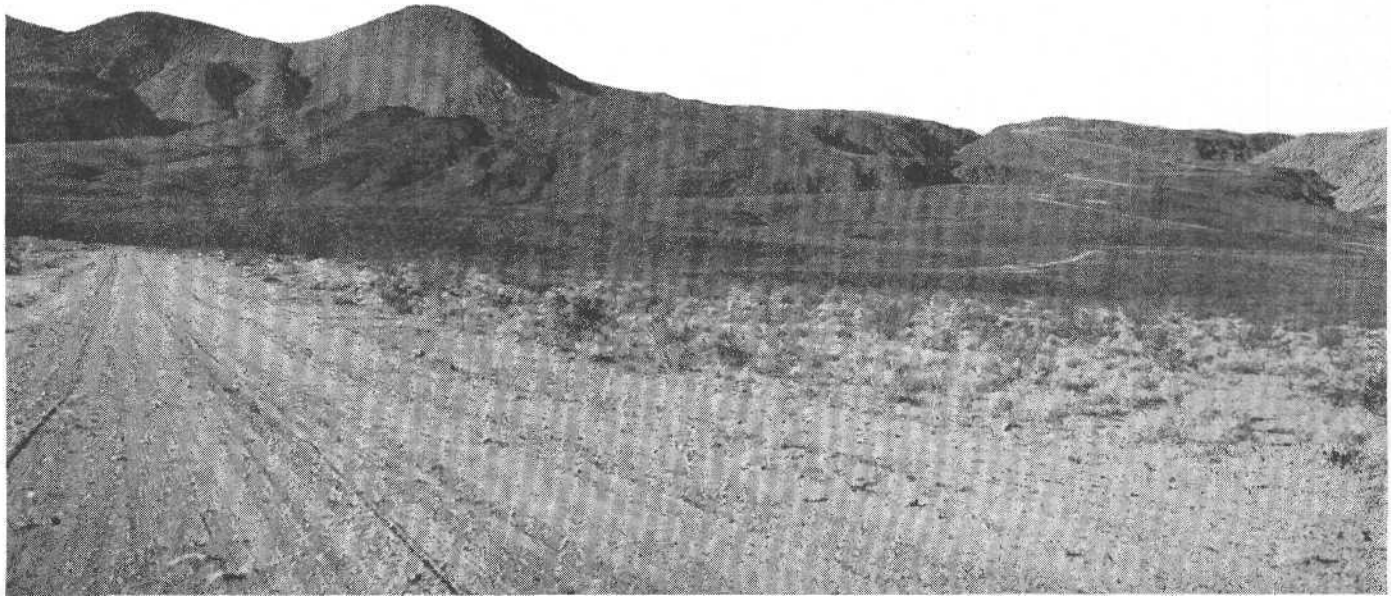
Once you could enter the range from Darwin, Brown or Coso Junction. Now the Darwin and Coso Junction roads are fenced off. To enter from the south, through the enormous ordnance station, requires security clearance and special permission.

The Navy has been zealous about protecting the known petroglyph canyons. But the only ones who drive the terrible road up Renegade Canyon out of the salt flats onto Wild Horse Mesa today are the security patrols. They stick to the well-defined jeep ruts and leave the exploring to the wind and the wild burro.

Recently the Southwest Museum established that Little Lake, not too many miles from the Hidden Canyon area, was once the home of Pinto and Gypsum Cave man—proof that the old people walked these lava hills at least 8000 years ago.

Somewhere in the back country, possibly near Lamotte Springs, there is a small box canyon. Staring from one wall of this rocky *cul-de-sac* is a row of cave mouths. These dry caves may contain the ornaments of ancient man—smooth, water-worn nuggets of gold.

Somewhere in the bleak, burned Coso Range is the Lost Canyon of the Ancients. The Renegade Canyon road, foreground, leads to the Wild Horse Mesa.



LETTERS

"Highest" Rockhound Society . . .

La Oroya, Peru

Desert:

I recently became acquainted with *Desert Magazine* and each time I pick up a new issue I am tempted to write you a letter. Now, with an issue in front of me, I take action on my impulse.

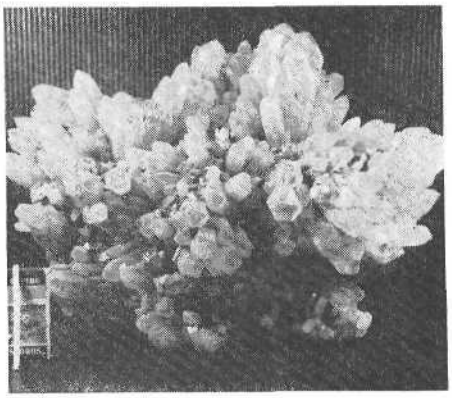
I have thought that perhaps you and your readers would like to know about the "highest society" in rockhound circles in the world — The Central Andean Rocks and Minerals Society. Our meeting place, the last Friday of each month, is Mayupampa School, La Oroyo, Peru; La Oroya is at an altitude of 12,200 feet above sea level and there are mountains all around! Our membership is cosmopolitan, consisting of 11 North Americans (9 U.S., 2 Canada), 4 Peruvians, 3 Germans, 3 Argentinians, and one each from the following countries: Austria, India, Switzerland and Great Britain. According to our constitution, meetings are conducted in English.

There are both advantages and disadvantages to being the highest mineral society in the world. One of our advantages is that we are in the middle of tremendous mining activity and it is an easy matter to get a first-class geologist or mining engineer to talk at our meetings—be he Dutch, Swiss, Australian or North American — the only condition being that he must speak in English.

Another advantage is the wealth of collecting material. Rockhounds are an oddity here, and mining superintendents readily give their approval for our visits to their dumps and mines just for the novelty of the situation—and perhaps for someone to talk to. Of course women are not allowed in the mines—an Indian superstition in the Andes, probably originating with the early Spaniards who also felt that a woman brought bad luck to a sailing vessel.

The mines in the Central Andes yield beautiful specimens of quartz, pyrite, sphalerite, galena, bismuthinite, argentite, tetrahedrite, realgar — the list goes on and on incorporating 17 different metallic elements ending with indium and thallium. Most of the world's indium comes from the Cerro de Pasco Corporation's huge smelter in La Oroya.

This is good fossil-hunting territory,



Above — The Lima to La Oroya highway at the continental divide. Altitude here is 16,000 feet above sea level. Below—Cluster of quartz crystals from the Andes Mountains of Peru.

too. Actually, the tops of the Andes are sedimentary and the predominent fossil is the ammonite, a large circular snail-like animal looking like the present-day chambered nautilus. It is common to find specimens a foot in diameter. Then there are the usual appearing small fossil snails, several types of fossil shells, and fossil sand-dollars (somewhat of a rarity here).

But, let's not forget the disadvantages. First, there is the high altitude. It takes a period of adjustment before one can search ardently for minerals here, since one must often go even higher than La Oroya for most of the minerals. The principal mines are at 14,000 to 15,000 feet above sea level. Did you know that you can scarcely make wood burn at these altitudes? However, the climate is ideal and the high altitude produces no serious or lasting effects.

The second disadvantage is that we don't have many visiting rockhounds —in fact, we dont' have any. Nobody to show our fine specimens to besides ourselves, and nobody to take around to the finest places, mineralogically speaking, of course. Perhaps we are just too far south or too hidden. But we would welcome any fellow rockhound and herewith extend our invitation to our friends north of the equator.

CRAIG BURNS, M.D., President,
Central Andean Rocks and
Minerals Society

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Moccasin Arch in Reverse . . .

San Francisco, California

Desert:

I don't generally find fault with your covers but I must take exception to the December, 1955, issue.

Having traveled and painted considerably in the Navajo country, and being very partial to the Monument Valley area, I was amazed to discover you had printed the picture of Moccasin Arch in reverse, and then labeled it "Window Rock," which is something else again, being located at least a hundred miles away at the Navajo Agency.

Hold the picture up to a mirror, then compare it with one you must have of the famous Moccasin Arch or better still, drop in sometime and look at the painting I made of it on the spot.

CHARLES L. REED

Dear Chuck: You are right—and I have no alibi. Apologies to you and all the Navajo Indians and Harry Goulding for transposing those two lovely arches.—R.H.

• • •

Catalpa Club Formed . . .

Lenwood-Grandview, California

Desert:

A group of us are in the process of organizing a Desert Catalpa Club whose main objective it will be to sponsor an annual festival in June when the *Chilopsis linearis* (known also as Desert Catalpa, Desert Willow, Desert Orchid) blooms.

We plan to hold our first festival in 1957. In the meantime we are launching a campaign to introduce the plants to home gardeners by sponsoring a home-planting contest with cash and other prizes. Judging will take place in June of this year.

In my work here I have developed some very fine color variants ranging from white to maroon, almost purple and cerise—and some of the plants have a very fine fragrance.

TED HUTCHISON

• • •

Small Price for Liberty . . .

China Lake, California

Desert:

I would like to present the other side of the military land-grab question in which you have repeatedly expressed the opinion that the Government has

usurped too much desert land for military bases and test areas.

As an employee of one of these desert test bases (Naval Ordnance Test Station at China Lake, California) I feel I must come to the Government's defense and explain why desert bases are needed.

The present international situation being what it is, it is imperative that this country be well armed. This does not only mean that we be well supplied with existing weapons, but that we continue to develop new ones.

Surely, no desert dweller will discount the value of preparedness.

As we develop newer, longer range weapons, we must have adequate space in which to test them. The desert is an ideal place for this work.

But, someone asks: "What about the sea? Why not test the weapons there?" In the first place, we do not control the sea beyond the three-mile limit. If a fishing boat wants to wander into a test area, we can ask it to leave, but we can't force it to do so. If fishing is good an important test may be delayed.

Another problem is weather. In weapons testing we need to see and photograph what goes on. The clear atmosphere of the desert is far superior to the foggy, stormy weather so often found at sea. And, too, the delicate instruments used in weapons testing need solid ground under them and would be useless on the rolling deck of a ship.

I regret as much as anyone that some very interesting country is closed to the public. I regret that desert bases have to exist at all. In some happier time we can hope that they can all be abolished and the public domain opened up to all. In the meantime, however, they seem to be a small enough price to pay for our liberty.

CHARLES E. HENDRIX

Dear Mr. Hendrix—Desert's position is this: We have no quarrel with the purpose of the Army, Navy or Air Force to establish adequate training and testing facilities on the desert. But, we do object to the policy of having 17 of them within the desert areas of California, Nevada and Arizona. A great deal of this range area is lying idle much of the time—unused but closed to all civilians. It is our view that if the operations of the three branches in their training work were co-ordinated as they must be in the event of a war, then the ranges could be reduced to one-third of the present number. We think they would constitute a more effective defense force in wartime if they practiced some co-ordination in peace time.—R.H.

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Why Kill Porcupines? . . .

Portland, Oregon

Desert:

I am at a loss to understand why Utah hunters are being urged to kill porcupines (*Desert*, December, 1955, p. 30). As a person who was saved from starvation by eating porcupines —the only animal I was able to catch —I realize their value—and also realize that they destroy trees and stock are injured once in a while by them. But, do they destroy as much timber as do careless loggers or careless smokers and campers?

Can it be that man is excusing himself from self-inflicted losses by pointing a finger and gun at the porcupine?

JIMMIE JAMES

Desert Quiz:

This is *Desert Magazine's* monthly test for those who want to become acquainted with the Southwest desert country. In these questions you'll find a bit of geography, history, botany, mineralogy and the lore of the desert and its white and Indian population. There are no penalties if you miss—and a lot of satisfaction in making a good score. Twelve to 14 is fair. 15 to 17 good, and 18 or better exceptional. The answers are on page 39.

1—One of the following reptiles is venomous: Chuckawalla____. Horned lizard____. Gila Monster____. Desert tortoise____.

2—A mescal pit was used by the desert Indians for: Storing food____. Cooking mescal____. Burying the dead____. Ceremonial purposes____.

3—Tahquitz was a god of the: Apache Indians____. Cahuilla Indians____. Paiute Indians____. Hopi Indians____.

4—Gem stone most sought by the Indians of the Southwest is: Turquoise____. Garnet____. Topaz____. Tourmaline____.

5—Squaw or Mormon tea is made from the stems of: Common sage____. Nolina____. Desert holly____. Ephedra____.

6—The home of the Chemehuevi Indians was along the banks of the: Rio Grande____. Colorado River____. Gila River____. San Juan River____.

7—The study of tamarisk would properly be undertaken by a: Zoologist____. Botanist____. Archeologist____. Herpetologist____.

8—Rappel is a term commonly used in: Skiing____. Hiking____. Mountain Climbing____. Swimming____.

9—The Tarantula Hawk preys on: Mice____. Rabbits____. Fish____. Spiders____.

10—Kaibab is the name of a forest in: Arizona____. Utah____. New Mexico____. California____.

11—Among students of the desert the name Philip A. Munz is associated with: Mining____. Archeology____. Botany____. Reclamation____.

12—The Indians who live in a tributary of the Grand Canyon are: Hopi____. Papago____. Havasupai____. Pima____.

13—Obsidian is an: Igneous rock____. Metamorphic Rock____. Sedimentary Rock____. Conglomerate____.

14—Marcos de Niza was: The founder of Tucson____. A friar with Coronado's expedition____. First white man to navigate the Grand Canyon____. The padre who proved that California was not an island____.

15—The highway across the top of Hoover dam links: California with Arizona____. California with Nevada____. Arizona with Nevada____. Utah with Nevada____.

16—One of the following cities is not on U.S. Highway 66: Albuquerque____. Flagstaff____. Tucson____. Barstow____.

17—The army officer in charge of the first camel caravan across the United States was: Kit Carson____. Lieut. Beale____. Lieut. Emory____. Gen. Kearny____.

18—Historically, the name Butterfield was associated with: The capture of Geronimo____. The Gadsden Purchase____. The Mormon migration to Utah____. The operation of the first transcontinental stage line to Southern California____.

19—Kayenta is a town in: Utah____. California____. New Mexico____. Arizona____.

20—Hohokam is the name given an extinct Indian tribe in: Death Valley____. Salt River Valley of Arizona____. Imperial Valley of California____. Tribesmen who built the cliff dwellings in New Mexico____.

Here and There on the Desert . . .

ARIZONA

Canada-Mexico Highway . . .

KINGMAN—Delegates to the International Five States Highway Association Convention have urged the swift completion of unimproved sections of Highway 93 in order to elevate that route to the status of a major Canada to Mexico highway. The federal highways numbering committee has been asked by the State of Arizona to designate 93 as a United States Highway from Kingman south to the Mexican border. It is presently a U.S. route only from the Canadian border to Kingman, but a state route from Kingman to Mexico.—*Mohave Miner*

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Navajos Seek Industry . . .

WINDOW ROCK — The Navajo tribe opened a $300,000 campaign to change its way of life from pastoral to industrial. The money, to be taken from tribal funds for industrial development, was appropriated by the Tribal Council in a 68 to 2 vote. How the money is to be used is up to the Navajo Advisory Committee and the tribal chairman, Paul Jones. — *New Mexican*

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Hopis Elect Council . . .

HOPI RESERVATION—The Hopis in their 12 self-governing villages went to the polls recently to elect representatives to the tribal council, the number being governed by population. The Hopis elected a tribal council after organizing under the Indian Reorganization Act in 1935, but by 1942 dissension became so great the council was disbanded. Later, it was reorganized, but has functioned in only a quasi-official manner. The Hopis have steadfastly refused to unite, even though their reservation has been encircled by the huge Navajo tribe. The new tribal council will be recognized by the U. S. Bureau of Indian Affairs. —*Phoenix Gazette*

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Indian Alcoholism Hit . . .

WASHINGTON, D. C. — Indian Commissioner Glenn L. Emmons said he hopes soon to be able to take some positive and practical steps to deal with the problem of alcoholism among American Indians. Emmons' statement is in reply to criticism of the situation voiced by Federal Judge Carl Hatch in Albuquerque. Hatch said there has been a growing number of intoxicated Indians since repeal of federal and state bans against sale of liquor to Indians.—*Phoenix Gazette*

Wetback Labor Declines . . .

PHOENIX—Executive Vice President C. B. Moore of the Western Growers Association declared that users of Mexican laborers "are watching carefully to see that no illegal labor (wetbacks) is used in their fields." Moore said the immigration department "to a large degree has cleaned up the wetback situation."—*Phoenix Gazette*

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Park Plan Endorsed . . .

YUMA — The Arizona Recreation Association has endorsed, in a resolution, plans for a widespread state park system proposed by the Arizona Development Board. Arizona is the only state in the Union without a park system, the Board reported.

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Deer Kidnappers Warned . . .

PHOENIX—Game and Fish Department officials report that an unusually heavy epidemic of deer snatching has broken out in the state among persons who, with the best of intentions, take fawns home with them. In spite of these good intentions, however, such acts are really heartless and to be condemned by all thoughtful citizens, the department declared. Ninety-nine times out of a hundred the mother of the fawn is hiding nearby when the would-be rescuer blunders onto the fawn. Because of her tremendous sense of smell, sight and hearing, there is no more chance of a doe losing her fawn than there is of a human mother misplacing her baby. It is normal for the doe to nurse her fawn only a few times each day and to depart for long stretches of time to feed. Kidnapping fawns is as serious as shooting the animal and will be treated accordingly, the department said. — *Casa Grande Dispatch*

Ancient Spear Points Found . . .

BISBEE — Big game hunters who killed huge mammoths in Arizona 10,000 years ago have again left their tracks (*Desert*, Oct. '55, p9). Members of the staff of the Arizona State Museum under its director, Dr. Emil Haury, have unearthed mammoth and buffalo bones together with spear points in the San Pedro Valley near Bisbee about 15 miles from the Mexican border. At least three and possibly four mammoth skeletons were intermixed with buffalo bones, five spear points, a stone knife, scraper and a big stone that was probably used as a chopper.—*Phoenix Gazette*

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Coyote Poisoning Begun . . .

SNOWFLAKE—Control of coyotes through the use of Compound 1080 is underway in Northeastern Arizona reports Vernon L. Frazier, U. S. Fish and Wildlife representative. Lethal stations will be set up at strategic locations and when they have served their purpose, usually by March, they will be picked up and destroyed, Frazier said. The stations consist of carcasses or other baits treated with Compound 1080, a lethal poison for which there is no known antidote.—*Holbrook Tribune-News*

CALIFORNIA

Sierra Nevadas Studied . . .

LONE PINE—Dr. Daniel I. Axelrod, UCLA professor of geology, has completed an extensive study of the fossil plants on the Sierra Nevadas. His research has helped establish approximately when the life zones on the mountains were established; when evolution began to operate in them; and why there is such a diversity of life in the area. Dr. Axelrod's fossil studies indicate that 15,000,000 years ago the range was a gentle slope that reached a height of probably no more than 3000 feet.—*Inyo Independent*

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Open Border Urged . . .

WASHINGTON, D. C.—Immigration Commissioner Joseph M. Swing urged early easing of entry requirements for Cubans and Mexicans and denied the move would open the floodgates to Communist infiltration. Under proposed agreements with Cuba and Mexico, the government would drop visa requirements for visiting Cubans and Mexicans.—*Yuma Sun*

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Coyote, Bobcat Hunt . . .

LONE PINE — A two-day Inyo County coyote and bobcat hunt was to be held January 7 and 8, according to the county board of supervisors. Those registered for the hunt were eligible for a $2 bounty for each animal killed.—*Inyo Register*

Farm Labor Contract . . .

MEXICO CITY — Negotiations were opened in Mexico City for a new contract to send Mexican farm hands to U.S. fields. The Bracero question long has been a sore spot on the Mexican conscience, observers report. Although the Mexican is pained to see the strong young backs of his countrymen heading north to be bent in stoop labor, statistics show why every contracting center in the republic is swamped with thousands of applications every year. Seventy percent of Mexican families survive on less than 10 pesos (80c U.S.) a day. Another 23 percent manage on between 11 and 27 pesos daily. The 50 to 75c an hour paid by U.S. farmers looks like big money to the Braceros. Mexican officialdom insists it is not equivalent to what the U. S. Worker gets for the same work.—*Salt Lake Tribune*

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Trail Use Declines . . .

MT. WHITNEY—While use of the Mt. Whitney Trail declined slightly during the past summer, the registration on the July 4 weekend set a new record for that holiday period, figures compiled by District Ranger Roy Saarni showed. A total of 6010 persons registered on the trail during the summer, a decrease of seven percent from the 6470 of last year which was the record season. Approximately 2100 hikers reached the top of the mountain, a drop of 17 percent from the 2519 of the previous summer. — *Inyo Register*

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Trout Planting Set . . .

LOS ANGELES—At least 75 percent of the catchable-size trout planted in Southern California next season by the Department of Fish and Game will be not less than seven and a half inches long and will average five to the pound. Increasing the size of catchables to be planted over the former program centered on a six to eight to the pound trout, is in line with the expressed wishes of sportsmen and the recommendation of the DFG.—*Inyo Register*

Palo Verde Bids In . . .

BLYTHE—The new permanent diversion dam on the Colorado River to divert water in Palo Verde Irrigation district canals will cost almost half a million dollars more than engineers' estimates for the project. This was revealed when bids from seven construction firms were opened at the U.S. Reclamation bureau office in Blythe. The two low bidders were W. E. Kier of El Segundo with a bid of $2,009,760 for construction of the earth and rock fill dam, and Haddox and Fisher of Yuma with a bid of $1,144,892 for construction of levees and drains.—*Palo Verde Valley Times*

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Fish Adapt to Salton Sea . . .

SALTON SEA—A first-rate sports fishing area may be developed in the Salton Sea, investigators believe. Two types of fish—pan-sized gulf croakers and large, gamey corvinas—seem to be adaptable to the tepid waters of the vast desert body of water. The croakers were introduced in 1950-51, and have multiplied rapidly. The corvinas were only planted two years ago, but are increasing at a rate that promises good fishing in two or three years. —*Indio News*

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Water Appeal Denied . . .

DESERT HOT SPRINGS — Interior Southern California communities may be barred from receiving Colorado River water following a ruling by the Metropolitan Water District rejecting a request by Desert Hot Springs for annexation to the Western Muncipal Water district. The community's application was denied on the grounds that the MWD can only legally serve the coastal plain of Southern California.—*Desert Sun*

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Park Site Studied . . .

LONE PINE—A representative of the Department of Parks and Beaches was in Lone Pine recently to investigate the possibility of establishing a state park in the Alabama Hills. Numerous local organizations have been actively urging creation of a state park at Alabama Hills since 1948.—*Inyo Independent*

NEVADA

State Sues Navy . . .

HAWTHORNE — A legal action has been filed by the State of Nevada in district court seeking to compel the Navy to comply with Nevada's water laws. The action involves six wells used by the Navy to supply water for the Hawthorne Naval Ammunition Depot. The complaint alleges that the federal government must comply with Nevada laws governing appropriation of underground water.—*Nevada State Journal*

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Quake Shifts Valley . . .

FALLON — Dixie Valley between Fairview Mountain and Westgate shifted eight feet during the December 16, 1954, earthquake according to recent findings of the U. S. Coast and Geodetic Survey. The quake, one of the major shocks of modern geological history, shifted the Westgate area approximately four feet south and the Fairview Mountain area about four feet north. Several hundred scientists are expected to visit the area next spring, according to Prof. David B. Slemmons, assistant professor of geology at the Mackay School of Mines. —*Fallon Standard*

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Gambling Winnings Up . . .

CARSON CITY — Nevada's legalized gambling industry was expected to set a new record in 1955 in terms of gross winnings. The state gaming board reported that gross winnings of 34 major casinos in the Las Vegas, Reno and Lake Tahoe areas alone for the first nine months of 1955 were about $11,000,000 higher than for the same period of 1954. Preliminary figures for 1955 show the present gambling tax will yield $3,955,532 or slightly more than double 1954's collections.—*Nevada State Journal*

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Carson Loses Out . . .

CARSON CITY — Statistics show that Carson City is no longer the nation's smallest state capital. Montpelier, Vermont, may now claim that title, and general consensus among Carson City businessmen is that something must be done to regain the "title," held for so many years by the historic Nevada city.—*Territorial Enterprise*

Pyramid Rancher Sued . . .

NIXON — Uncle Sam, who may soon be sued for $200,000,000 by the Pyramid Lake Indians, recently filed a lawsuit in their behalf, a civil action charging W. J. Cerasola of Wadsworth with trespassing on the Indian reservation at Nixon. The suit seeks $1000 general damages from the Wadsworth rancher plus a $561 penalty provided by Federal statute. The suit charges that since June, 1954, Cerasola has driven his cattle on the reservation on eight separate occasions without permission of the Indians.—*Nevada State Journal*

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Traffic Deaths High . . .

CARSON CITY — The National Safety Council reports the mileage death rate in Nevada last year was 10.5 persons per 100,000,000 miles of travel, compared to the national average of 6.5. Although the state's 225,000 residents own only 100,000 automobiles, out of state traffic will send an estimated 3,000,000 automobiles carrying better than 8,000,000 passengers through the state by the end of 1955.—*Nevada State Journal*

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NEW MEXICO

Land Transfer Pushed . . .

SANTA FE—Floyd Lee and Dee Brownfield, leaders in the promotion of the range-saving Taylor Grazing Act of 22 years ago, are at work on another land reform that observers predict will lead to all the federal public domain being ceded to the states. The process is expected to follow the course that led to the federal government recently ceding the tidelands to the states. The program is being carried forward by the New Mexico Land Resources Study Council, not initially organized with the idea of getting the federal land for the state but to try to bring order to federal land operations within the state. It was only after the program was developed that observers conceived that if successful it would lead to the federal government giving its lands to the state.—Will Harrison in the *New Mexican*

Barbary Rams Surveyed . . .

ROY — A scientific expedition, armed with high-powered rifles, field glasses and kibitzers is trying to determine if the nation has a new big game animal to hunt. A group of 60 persons invaded the 30-mile stretch of the cliff-rimmed Canadian River canyon, seeking 25 Barbary rams, part of a herd of about 200, the only wild group of its kind on the North American continent. Purpose of the hunt was to gain more information on the sheep. The scientists hope to learn specifically what the animals eat, if any parasites bother them, and their habits. —*New Mexican*

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Farm Sizes Increase . . .

SANTA FE—New Mexico's farms and ranches continue to diminish in number and expand in size. This is one of the main trends noted by Vincent T. Ximenes of the University of New Mexico's Bureau of Business Research in an analysis of the most recent U. S. Census of Agriculture. Reasons for the trend, started in 1940: attraction of cash wages in the larger cities; lower commodity prices; shortages of water; and higher cash requirements for mechanical equipment. — *Lovington Press*

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Law Unconstitutional . . .

SANTA FE—The law which supporters called a boon to attract new industry to the state has been thrown out as unconstitutional. It violated the constitutional ban on government aiding private enterprise, the state supreme court has ruled. Passed by the 1955 Legislature, the act permitted municipalities to issue revenue bonds to acquire industrial or business properties for leasing to private interests. —*New Mexican*

THE DESERT TRADING POST

Classified Advertising in This Section Costs 12c a Word, $2.00 Minimum Per Issue

INDIAN GOODS

5 FINE ANCIENT Indian arrowheads, $2. Flint eagle ceremonial, $2. Perfect Folsome, $5. Spearhead, $1. List Free. Lear's Glenwood, Arkansas.

BEAUTIFUL OBSIDIAN arrowheads from the Klamath Country. Black $1.00; gray $1.50; translucent $2.00; profusely illustrated catalog 50c. Moise Penning, 158 Dolorosa, San Lorenzo, California.

BEAUTIFUL TURQUOISE and Silver jewelry by the Pueblo Tribes — Authentic Navajo rugs. The Bradleys, 4639 Crenshaw Blvd., Los Angeles 43, California.

SIX FINE Ancient Indian Arrowheads—$2.00. Fine granite Tomahawk — $2.10. Effigy pipe $4.00. Perfect flint thunderbird—$3.00. Flint fish hook—$3.00. List free. Arrowhead, Box 1249, Hot Springs, Arkansas.

OLD INDIAN horn spoon, $1.75. Fine, old Indian basket, $3.00. Five ancient arrowheads, $1.00. 24-inch strand California Mound trade beads, $1.00. Abalone shell pendant, $1.00. Have other relics, beadwork, pipes, pipe-tomahawks. Also want to buy or trade for all kinds old Indian material. (Have Indian-Western books, guns, swords, Navajo rugs—sell or trade). Paul L. Summers, Canyon, Texas.

OVER 600 fine old baskets. Many rare Navajo rugs, both old and new, Bayeta-Germantown. Artifacts, gems, and fine Indian jewelry. Open daily 10 to 6, closed Mondays. Buffalo Trading Post, Highway 18, Apple Valley, California.

BOOKS — MAGAZINES

BOOKS FOUND—Any title! Free worldwide book search service. Any book, new or old. Western Americana a specialty. Lowest price. Send wants today! International Bookfinders, Box 3003-D, Beverly Hills, California.

WOOD AND WEEDS. Fun with dried things by Frances Bostic. Sixteen illustrations of dried arrangements with text. $1.35 Postpaid, Desert Crafts Shop, Palm Desert, California.

WANTED—Back issues of Desert Magazine. Will pay $5 for Nov. '37; $1 for Apr. '38; $1.50 for Sept. '38, in good condition. Desert Magazine, Palm Desert, California.

REAL ESTATE

SAVE, BUY DIRECT from Government, Surplus Farms, land, homes, etc. List $1.00. Box 169-DMA, East Hartford 8, Connecticut.

VIEW LOTS — Palm Desert Heights. Just above Desert Magazine block. Near Shadow Mountain Club, school, church, market, bus. 70x100, $1200 up. Paved, gas, elec., water. Restricted. For brochure write Box 65, Palm Desert, California.

WARM, BEAUTIFUL 80 acre desert parcel overlooking Coachella Valley. Owner will guarantee big well at his cost. $500 per acre. One acre near Box Canyon. Has domestic water. Price $1850, will consider trust deed or late model car. Lovely Palm Village home, pool, garden, priced for under real value at $50,000. For any type Desert Real Estate write Ronald L. Johnson, Box 162, Thermal, California.

UNSURPASSED gasoline station and trailer camp. Location in most beautiful part of the Imperial Valley, California. Close to deluxe hot dog and coffee shop now doing a paying business. Location on U. S. Highway 80, 24 miles west of El Centro, California. Frontage 400 feet with 3 level acres. Price $3500 with water and electricity to property. Write H. D., P. O. Box 151, Plaster City, California, for full particulars.

MISCELLANEOUS

DESERT TEA. One pound one dollar postpaid. Greasewood Greenhouses, Lenwood, Barstow, California.

GHOST TOWN ITEMS: Sun-colored glass, amethyst to royal purple; ghost railroads materials, tickets; limited odd items from camps of the '60s. Write your interest—Box 64-D, Smith, Nevada.

BUILD YOUR OWN real swimming pool! Fun for the entire family! Easy plan and instructions, only $1.00. Delta Pools, Box 604, Stockton, California.

SECTIONIZED COUNTY MAPS — San Bernardino $1; Riverside $1; Imperial 50c; San Diego 50c; Inyo 75c; other California counties $1.25 each. Nevada counties $1 each. Topographic maps of all mapped areas. Westwide Maps Co., 114 W. Third St., Los Angeles, California.

FOR SUPER SHARP knives use patented "Rolit" sharpener. Guaranteed. $1.25 postpaid. "Rolit," 392 W. Center St., Springville, Utah.

STAMP COLLECTORS lists. Old Americans free. All Southwests available. Collections purchased. Hammond D78J, Crystal Beach, Florida.

PAN GOLD: $1 for 75 panning areas in 25 California counties. Geological formations, elevations, pertinent notes. Panning pans $2.75, $2.25. Leather nugget and dust poke $1. Fred Mark, Box 801, Ojai, California.

OLD WALL TELEPHONES—oak cabinet, good condition. Regular $15—now $9.95. Two $18.50. Six $50.00. Tontz's, Dept. 31, Elsinore, California.

GOLD PROSPECTING CATALOG—Listing, placer and lode maps, steel gold pans, mining and mineral books, books on lost mines, pocket magnifying glasses, mineral collection sets, blueprints of dry washers and wet washers you can build yourself. Catalog and Gold Panning Lessons — Free. Old Prospector, Box 729, Desk 5, Lodi, California.

INTERESTED IN Prospecting for Gold and Industrial Minerals? Join United Prospectors and read Panning Gold. Write for application: United Prospectors, 701½ E. Edgeware Rd., Los Angeles 26, California.

URANIUM MAP of Southwest. Geiger counters, scintillators, snooper, $29.95 up. Free catalog, or better, send $1.00 for authentic uranium map of Southwest Desert and catalog. Harry's Geiger Counters, 360 So. Hawthorne Blvd., Hawthorne, California.

INDIAN PHONOGRAPH Records. New Singers! Latest Songs! As well as many old-time songs and chants—all completely authentic. Write for free record list No. 5. Canyon Records, 834 N. 7th Avenue, Phoenix, Arizona.

SILVERY DESERT HOLLY plants: One dollar each postpaid. Greasewood Greenhouses, Lenwood, Barstow, California.

HAVE REAL FUN with desert gems, minerals and rocks. The rockhound's how-to-do-it magazine tells how. One year (12 issues) only $3.00. Sample 25c. Gems and Minerals, Dept. J10, Palmdale, California.

BUY SURPLUS DIRECT from government at tremendous savings. Farm tools, machinery, feed, truck, jeep, tractor. Hundreds of others. List $1.00. Box 169-Daa East Hartford 8, Connecticut.

FIND BURIED TREASURE, gold and silver, with Goldak's sensational 3½ lb. "Find-It" locator, only $49.50. Write for free literature on complete line of mineral, metal locators; Geiger and scintillation counters. Goldak, 1541 W. Glenoaks Blvd., Glendale, California.

BECOME A GAME WARDEN, Professional Hunter! Join Forestry, Park, Fishery Services. Good Pay! Opportunities Open! Free! Revealing "Select-Job Chart," details, job-getting secrets. Write Home Study Educators, 1036-33 La Brea, Los Angeles 19, California.

NEW! Uranium detector kit, $8.49. Guaranteed. Postpaid. Free catalog. CMG Industries, Box 611-DM, Laramie, Wyo.

LADY GODIVA "The World's Finest Beautifier." For women who wish to become beautiful, for women who wish to remain beautiful. An outstanding desert cream. For information, write or call Lola Barnes, 963 N. Oakland, Pasadena 6, Calif., or phone SYcamore 4-2378.

KEY RING of Beauty and Utility. Beautiful gem stone of either squared or irregular shape mounted on attractive domestic or exotic wood. Each Key Ring carries with it the name and origin of the gem stone. Also common name of wood, the botanical or scientific name as well as origin of wood. Equipped with chain for keys. $1.50 plus federal excise tax. E. F. Dival, 515½ Geneva Street, Glendale 6, California.

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Range Feed Increases . . .

LAS CRUCES—The United States Department of Agriculture's Office of the Agricultural Statistician says the New Mexico range feed supply is much larger this year than for the last several years. The office said that although ranges are becoming dry, livestock is entering the winter in good condition.—*New Mexican*

Navajos Report Tiger . . .

GALLUP—Drivers for the General Services Administration and Navajo Indians reported seeing large cat tracks which a professional government hunter said are not those of a mountain lion. Immediately speculation centered on the incident four years ago when a circus wagon was wrecked about 50 miles north of Gallup and a lion and tiger escaped and were never recaptured. Others believe the "tiger" may be a giant jaguar which has migrated north from Central Mexico.—*New Mexican*

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10,000 Deer Killed . . .

SANTA FE — Reports from 13 major Game Department checking stations showed New Mexico hunters bagged nearly 10,000 deer, 434 turkeys and 12 bears during the general hunting season. However, State Game Director Homer C. Pickins estimated that the total deer kill will reach approximately 30,000 when complete reports are in.—*Alamogordo Daily News*

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UTAH

Indians Shun U.S. Move . . .

SALT LAKE CITY — National Congress of American Indians executive council, representing some 200,000 Indians from 20 tribes, went on record opposing national legislation which will withdraw federal guardianship of Indians. The Council, headed by Joseph R. Garry, Plummer, Idaho, declared that "the legislation which has passed will mean abrogating all treaties between the United States and Indian tribes. It will be the end of all contractual relations between the two parties." The Indians said they were not too concerned over the withdrawal of government services, but were concerned over the status of Indian lands. The Congress' annual convention will be held at Salt Lake City in September of this year.—*Salt Lake Tribune*

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Dugway Surveyed . . .

TOOELE — The Bureau of Land Management announced the completion of official surveys of the boundaries of Dugway Proving Ground, the Army's vast experimental chemical warfare range southwest of Tooele. The Dugway area originally was estimated at 279,000 acres, but actually is closer to 286,000 acres, according to the BLM. A survey of the Cedar Mountain portion of the proving ground's eastern boundary for a distance of more than 18 miles now definitely establishes a line which since 1942 had been designated only as "the summit of Cedar Mountain Range." — *Salt Lake Tribune*

Project Gains Support . . .

WASHINGTON, D. C. — Spokesmen for two conservation groups have given Rep. William A. Dawson of Utah written assurance that they no longer will oppose the upper Colorado storage project now that Echo Park has been deleted. President Richard Westwood of the American Nature Association and Carl D. Shoemaker of the National Wildlife Federation have agreed to withdraw their opposition to the project.—*Salt Lake Tribune*

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Cloud Seeding Progress . . .

MOAB—The result of four years (1951-55) of cloud seeding operations over Southern Utah by Water Resources Development Corp. of Denver, Colorado, show benefits of from 10 to 30 percent of normal precipitation to the target area, the corporation reported.—*San Juan Record*

New and Improved Products for Desert Living

NEW CHEWING GUM AIDS MOTION SICKNESS VICTIMS

A pharmaceutical company, Chas. Pfizer & Co., announced development of a chewing gum that prevents motion sickness. The new product, Bonamine chewing tablets, will protect travelers against queasy feelings for 24 hours at a stretch, the manufacturers claim. A dose of one or two tablets is effective for all types of travel.

The first travel gum ever marketed, Bonamine is especially useful for children since it eliminates the need for a water "chaser" and can be taken at any moment.

The gum contains a compound of meclizine hydrochloride in sugar coating. Clinical tests conducted by the Armed Forces aboard troopships and during airborne operations showed that the Bonamine contained in one piece of gum will protect a traveler up to 24 hours.

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NEW AUGER DESIGNED TO FEED TREES AT ROOT LEVEL

A new small and inexpensive auger especially designed for applying plant food to the feeding roots of trees, shrubs, and hedges has been put on the market. It bores a hole 2 inches in diameter and up to 36 inches deep. The new product comes in two models, one with a cross handle for hand operation and a model that can be operated with an electric hand drill.

It is designed to bore holes of ideal size and depth to apply enough commercial fertilizer to keep shade trees in good foliage, flowering shrubs blooming more abundantly, and fruit trees bearing at peak capacity for several seasons with one feeding.

The auger is sold in hardware and department stores and other garden supply outlets. Additional information can be had from the manufacturer, A. B. Chance Company of Centralia, Missouri and 815 Tennessee Street, San Francisco, California.

Dinosaur Display Planned . . .

VERNAL—A life-size, 15-foot high and 76-foot long dinosaur skeleton model is planned for the front lawn of the Utah Field House of Natural History at Vernal. More than 500 concrete castings will be made and assembled. The dinosaur model is a diplodocus.—*Vernal Express*

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Lake Bed Studied . . .

OGDEN—Southern Pacific Railroad engineers and scientists are conducting extensive studies of the bottom of the Great Salt Lake to determine the most feasible route for a solid earth and stone fill across the central part of the lake to carry trains. Eventually the fill is expected to extend 13 miles, connecting the ends of existing shallower fills. The new road across the lake will by-pass the world-famous trestle which spans the 75-mile long and 31-mile wide lake. — *Box Elder News*

MINES and MINING

Henderson, Nevada . . .

The American Potash and Chemical Corp. of California has purchased control of the Western Electrochemical Co. at Henderson for $5,000,000. The Henderson plant manufactures fuel for Jato units for the armed forces and insect control chemicals such as DDT.—*Humboldt Star*

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Drake, Arizona . . .

Plans for a $6,500,000 cement manufacturing plant in Northern Arizona were announced by officials of the Republic Cement Corporation. The plant is expected to provide employment for 81 persons. It will be located at Drake, midway between Prescott and Ash Fork. Plans call for a daily production capacity of 2500 barrels of gray cement and 750 barrels of white cement.—*Phoenix Gazette*

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Washington, D. C. . . .

Western miners apparently have no serious objections to a new regulation limiting the size of hard rock mineral prospecting permits and leases on certain federal lands. At least they have not made objections known to Interior Department officials administering the acreage restrictions on lands acquired by the federal government through purchase or other means. The new regulation limits to 10,240 acres the total holdings of one permittee or lessee for one mineral in any one state under combined prospecting permit and lease. The Interior Department's Bureau of Land Management recently announced it would suspend action on pending applications in excess of 10,240 acres. This will permit officials to study testimony presented at a recent hearing on the regulations, during which Eastern miners protested the acreage restriction.—*New Mexican*

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Moab, Utah . . .

Atlas Uranium Corp. has blocked out copper ore valued conservatively at $2,500,000. The discovery was made on two Atlas claims in Lisbon Valley, southeast of Moab in San Juan County. Wells have been drilled to assure an ample supply of water for a processing mill. Ore lies near the surface so that economical strip mining will be possible.—*Dove Creek Press*

Salt Lake City, Utah . . .

Kennecott Copper Corporation has purchased the Butterfield mines in the Oquirrh Range south of the big Bingham copper pit in a million dollar deal. Seller was Samuel S. Arentz, Salt Lake mining engineer who had obtained a lease and option to buy the highgrade lead-silver-zinc producer from Combined Metals Reduction Co. In all about 3800 acres of land were included in the transaction. Most of the claims on the property are patented. These original mining claims establish the property as among the oldest in the state. Some of the locations go back as far as 1870.—*Salt Lake Tribune*

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Boron, California . . .

Isbell Construction Co. of Reno, Nevada, has been awarded the contract for preliminary stripping of dirt in the Pacific Coast Borax Company's open mine development project at Boron. The contract calls for removal of 10,000,000 tons of dirt from the borax deposit. Open pit mining operations are scheduled to start early this year. —*Boron Enterprise*

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Grass Valley, California . . .

The Idaho-Maryland Mine Corporation, largest gold mining concern in the Grass Valley area, reported it is experiencing a boom in tungsten mining and will erect a new mill. Approximately 22,000 pounds of concentrate have been delivered since August and the ore is running 75 to 80 percent. The new mill is planned for a site at the New Brunswick mine.—*Pioche Record*

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Oro Quay Park, New Mexico . . .

Onego, Corp., has discovered what appears to be one of the most important gold deposits ever found in New Mexico on Oro Quay Park in the San Pedro Mountains, 47 miles southwest of Santa Fe. Besides gold, copper in abundance and iron ore of high quality have been located on the 400 acre property acquired by Onego. — *New Mexican*

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Ruth, Nevada . . .

Removal of an estimated 2,000,000 tons of earth that tumbled into the Kennecott Copper Company's huge open pit mine at Ruth was expected to begin as soon as the cause of the accident was determined. One worker was buried by the huge slide and two others were injured.—*Salt Lake Tribune*

Santa Fe, New Mexico . . .

Officials of the New Mexico Economic Development Commission believe there is a good chance for development of an important mica industry in Northern New Mexico and perhaps in other portions of the state. Sam Glassmire, Los Alamos geologist, is preparing a detailed report on mica deposits for the EDC which will be presented to the Office of Strategic Materials, Office of Defense Mobilization, the Department of Commerce, and other federal agencies interested in stockpiling the strategic material. The federal government recently announced that a substitute for mica will be sought.—*New Mexican*

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Tempiute, Nevada . . .

Wah Chang Mining Corporation announced that tungsten production at its largest operation, the Lincoln Mine at Tempiute, has reached approximately 825 tons daily, with 700 tons per day milled on a 24 hour per week basis. The company's California operations are centered around the Black Rock Mine, 32 miles north of Bishop where production totals approximately 700 tons per day and 500 to 600 tons per day are milled at the company's mill and the remainder shipped to a nearby custom mill.—*Nevada State Journal*

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Tucson, Arizona . . .

Wesley P. Gross, president and general manager of San Manuel Copper Corp., and Magma Copper Co., announced recently that the San Manuel mine will reach full production of 35,000 ore tons daily by mid-1956. The new mine is located 45 miles northeast of Tucson on State Highway 77. At full production, Goss estimated 1850 men—500 more than at present—will be employed. The mill operation is expected to produce about 400,000 pounds of copper daily, and about 18,000 pounds of molybdenum and molybdenum sulphites.—*Phoenix Gazette*

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Washington, D. C. . . .

Congress will be asked to authorize funds for construction of a concentration mill for the nation's stockpiled manganese. Rep. John J. Rhodes of Arizona said he will submit the proposal as the result of studies made by the house interior committee's subcommittee on minerals. At the present time most of this nation's stockpiled manganese is of too low grade for direct use in steel-hardening processes.—*Phoenix Gazette*

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Salt Lake City, Utah . . .

Kennecott Copper Corporation announced that it will cease being landlord to thousands of employees in four western states as a result of a $5,000,000 deal with John W. Galbreath & Co., Columbus, Ohio, real estate firm. Many employees in company housing will be given an opportunity to own their own home. Affected are the company towns at Copperton, Magna and Garfield in Utah; Ruth, New Ruth and McGill in Nevada; Ray and Hayden in Arizona; and Hurley and Santa Anita in New Mexico.—*Salt Lake Tribune*

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Lone Pine, California . . .

Saline Valley and other areas threatened with mining closures through military acquisition, came in for outstanding support at the recent Western Governors Minerals Policy Conference. The governors recommended that Congress investigate Federal lands withdrawn from mineral entry to determine whether some could be returned to private owners. They also recommended that hearings be held before future land withdrawals and that further withdrawal should be opposed.—*Inyo Register*

BOOM DAYS IN URANIUM

Industrial Interest in Uranium Increasing, AEC Official Says

The Grand Junction Operations Office of the AEC believes there was more activity on the uranium fields of the Colorado Plateau at the end of 1955 than there was in December, 1954.

Sheldon P. Wimpfen, manager of the Grand Junction Operations Office, said there had been a seasonal decline in letters received and inquiries made at the AEC's office, but he rejected current stories that the decline in interest reflected a failure to find large ore bodies in the area administered by his office.

Fifteen proposals were made to him from various parties seeking establishment of mills serving rapidly developing uranium ore areas. One firm, which several months ago was granted a contract to build a modest-sized concentrator, has now requested a new contract which would increase input capacity up to six times that originally programmed.

Wimpfen added that he was never convinced "uranium fever" was a good thing for the industry or for the public if it led to speculation.

There has been so much interest, in fact, on the part of mining, oil, chemical and engineering firms in uranium that the Grand Junction Office is preparing a sample pro forma contract for purchase of uranium concentrates for study by interested parties. Such contracts are only guides and do not preclude the necessity of negotiation with AEC on concentrate purchasing.—*Salt Lake Tribune*

Infant Uranium Industry In Adjustment Stage

Uranium, viewed as a new industry akin to the early days of railroads, oil and automobiles, is now in the confused stage inevitable whenever any new industry is launched and is in its early struggles to find its place in the world, Dr. Donald M. Menzel, physicist and director of Harvard observatory, believes.

What is happening to uranium has occurred to almost every new industry in history, he points out. Dr. Menzel is convinced that uranium is only now at the beginning of its importance in the future development of worldwide industry. Only recently has its full impact on the world's future begun to be organized. Accepted at first as an important and vital item in war munitions of amazingly destructive power, it has moved ahead to a place where its future is limitless, as indicated by nuclear powered submarines and aircraft carriers, and the steady advances being made in nuclear powered plants to develop cheap electricity as a sideline.

Dr. Menzel expressed concern over the limitation on the government's uranium purchasing program: "Some persons have voiced concern because the government's program to buy uranium runs only until 1962. The prospects are good that demands by private industry for uranium power will be able to support the uranium industry well before that time. However, it seems unbelievable that the government could refuse to extend the present legislation if the growing uranium industry should require such assistance."—*Reese River Reveille*

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Prospectors Seek U-Ore On Candian Lake Bed

A Salt Lake City, Utah, firm will engage in underwater prospecting for uranium ore in the Beaver Lodge Lake north of Saskatoon, Sask. Treasure Uranium and Resources, Ltd., a subsidiary of Treasure Uranium and Resources, will use underwater scintillation equipment to prospect its claim in the area — three-quarters of which is under the lake, says David A. Robinson, Secretary of the firm. If response is favorable, core drilling through the ice will be conducted.—*Mining Record*

Happy Jack Changes Hands In Record Transaction

The famed Happy Jack mine was sold recently in the largest uranium transaction in history. Fletcher Bronson, his son Grant and Joe Cooper, all of Monticello, sold it to a new uranium mining and processing firm to be known as the National Mining and Milling Corporation for an outright cash payment of $10,000,000 and additional payments with a guaranteed minimum over a 10 year period that could bring the total price to a maximum of $30,000,000.

The letting of an option to buy the property and its final sale occurred almost simultaneously. T. R. Gillenwaters of Grand Junction, Colorado, and Los Angeles, represented the Bronsons and Cooper in the original negotiations for an option with the Barlu Oil Co. of Dallas, Texas. National Mining will take over the option from Barlu.

The new firm plans to cover mining, milling, metal reduction and nuclear reactors, should the latter prove a profitable venture after research work is done. National Mining plans initially to mine the Happy Jack and to construct a uranium processing mill in the White Canyon area, probably at Hite, Utah. However, a company spokesman said the plans of the new company go much farther than the Happy Jack property. — *San Juan Record*

Uranium Discovery in Grand Canyon Reported

Richard Wyman, superintendent of Western Gold, reports that the Golden Crown Mining Company, a subsidiary of Western Gold and Uranium, Inc., is now drilling and developing a uranium deposit that appears to be one of the largest yet found in the United States.

The property is known as the Orphan Mine and is located on the south rim of Grand Canyon on the only private property within Grand Canyon National Monument.

Some assays showed three percent U308 and minable vein widths of 40 feet are indicated. The deposit is in a mineralized sheer zone in the Coconino sandstone. — *Washington County News*

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Geologist Says New Mexico Leads in U-Ore Reserves

Albuquerque geologist Henry S. Birdseye predicted that New Mexico will one day be the leader in every aspect of the uranium industry.

He said the enormous ore reserves of the Ambrosia Lake district near Grants, combined with anticipated increases in the state's milling capacity, should put New Mexico out front in the future.

Birdseye said security regulations prevent knowledge of detailed information on production rates, ore tonnages and grade of ore among states. But, certain clues, he said, show that New Mexico almost certainly is far in the lead among states in proven tonnages of uranium ore.

"At least 11 major ore bodies are now known in the Grants area," Birdseye declared. He described a major ore body as one with blocked-out reserves in excess of 100,000 tons of ore.—*New Mexican*

Yuma, Arizona, uranium seekers were encouraged by a recent report from Gila County that 60 uranium claims near Tonto Basin were included in a lease-option agreement recorded with Tom Frates, representative of the Boswell-Frates Co. of Tulsa, Oklahoma. The 60 claims are owned by the Conway family of the Tonto Basin area. If the buyer exercises its option, a total of $1,270,000 will be paid to the family.—*Yuma Sun*

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Book Describes California Uranium Discovery Potentials

Where to Look for Uranium in California is a comprehensive study of the state's uranium mining potential by counties. Author Lee Raymond provides complete bibliographies with each county discussion for those interested in more technical research. The author also touches on the more basic phases of uranium hunting: where a prospector is allowed to hunt uranium, what he should take with him, what he should look for, where to send samples for identification and assaying, etc.

Published by the Western Mining Magazine, P. O. Box 787, Sonora, California. Paper cover, tables, charts, seven maps of the state showing physiographic provinces, copper deposits, lead-silver-zinc deposits, known pegmatite areas, known fluorspar deposits, known coal deposits, cobalt and bismuth minerals, 40 pp., $1.00.

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Nuclear Metals Corporation is negotiating with the Atomic Energy Commission to establish a uranium mill in White Canyon, San Juan County. The firm has been successful in getting 383.4 acres of land two miles east of the junction of White Canyon and the Colorado River set aside for a mill and townsite.

Initial publication of the withdrawal from the Public Domain was contained in a November issue of the *Federal Register*.—*Salt Lake Tribune*

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New Uranium Ore, Coffinite, Discovered in Mesa County

Coffinite, a new uranium mineral, has been discovered in Mesa County, Colorado. Coffinite has a high uranium content, but can be identified only by means of X-ray studies. Initial discovery was made at the La Sal Number Two mine in the Gateway area. Since then, coffinite has been identified in Wyoming, Arizona, Utah and several foreign countries. Some deposits are black and shiny, heavier than other pitchblende type ores, other deposits are of a reddish tinge while still others are black and powdery.—*American Prospectors Journal*

Fluorescent Light Aids In Lithium Discoveries

Fluorescent mineralight, invented for the Nevada Massachusetts Company and a historic aid in tungsten exploration and other mineral discoveries, has a new use in discovering lithium, a potential new atomic energy source.

The deep rose glow of eucryptite, an ore of lithium, has been added to the long list of fluorescent colors which the mineralight fortune seekers are looking for.

Others in this class are the yellow green fluorescence of uranium, the bluish green of zinc, the golden yellow of zirconium, the bright blue of thallium in solution and the black ultra-violet absorbing vapor of heated mercury. Lithium is the lightest metal known.—*Lovelock Review Miner*

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Fourteenth U.S. U-Ore Mill Approved by AEC

The AEC and Continental Uranium, Inc., of Grand Junction, Colorado, have signed a contract for the construction and operation by Continental of a uranium processing mill at La Sal, Utah. Construction of the plant was expected to begin in December with completion scheduled for summer.

The new uranium mill will be owned and operated by Continental and the entire output of uranium concentrates will be purchased by the Commission. La Sal is in San Juan County on the northern edge of the famous Big Indian Wash mining district.

Completion of the La Sal mill will bring to 14 the number of uranium processing mills operating in the western United States. Nine mills are producing uranium concentrates and four others were still in various stages of construction at year's end at Edgemont, South Dakota; Moab, Utah; Tuba City, Arizona; and Maybell, Colorado. — *San Juan Record*

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AEC Approves Work on Major Utah U-Ore Find

A penny stock company has been certified by the AEC to develop a "major occurrence" of uranium on the Colorado Plateau. The occurrence is the mine being developed jointly at Indian Creek, 39 miles northwest of Monticello, Utah, where ore reserves valued at $3,000,000 in place have been confirmed.

Boyles Brothers, drilling and mine contracting firm of Salt Lake City, took over development of the property on a 50-50 basis after initial discovery had been made more than two years ago by Royal—a firm which raised its initial capital by selling shares at six cents each.

The AEC describes the property as a channel of some of the nation's purest primary grade uranium ore determined to date to run a distance of 3000 feet. The ore averages eight feet in depth on the face. The channel varies from 70 to more than a hundred feet in width. The company has been shipping at a rate of 85 tons daily from a small (12 man) three-shift operation employing two front end loaders. Initial incline shaft and mining tunnel is in 500 feet on the 3000-foot long channel. — *Salt Lake Tribune*

Largest Mill Uses Sulphuric Acid to Recover Uranium

The nation's biggest uranium mill was scheduled to go into operation at the first of the year, mass producing the source of atomic energy by a new process.

Anaconda Copper Mining Co. will open the new division of its giant Bluewater, New Mexico, mill which will use sulphuric acid to leach uranium from sandstone ore. The massive plant will supplement the company's original carbonate leaching mill, built to handle limestone ore. A new subsidiary plant to make acid from sulphur shipped in from Texas is already in operation.

Jack Knaebel, manager of the uranium mill, explained that the necessity to find a better way to take uranium from ore out of the firm's Jackpile Mine paved the way for the creation of the plant.

The company will not shut down its carbonate leaching mill. That part of the operation will continue handling ore from Anaconda's first mines, in limestone about eight miles north of the plant, and from the Santa Fe Railway's big Haystack Mountain Mine to the northwest, which also is in limestone.

It will mean, however, that Anaconda will cease accepting ore from smaller operators, one of the principal reasons being that all its ore crushing apparatus will be hard pressed to handle its own production and that from Haystack.

While the sulphuric acid mill has been under construction, the original mill has been handling both limestone and sandstone ore, but the acid mill will handle the sandstone ore much more satisfactorily, Knaebel explained. Together, the two mills will have four times the capacity of the original plant.

Jackpile, on Laguna Reservation land, is one-half mile wide and one mile long. One of the principal parts in the leasing agreement calls for employment of Lagunas wherever possible. — *Alamogordo Daily News*

The uranium ore body that set off the year's biggest rush of exploration activity has finally been reached. The Mid-Continent Exploration Co. shaft is close to 400 feet down and is into the ore. Claud Jones, superintendent, reports miners are making entries into the ore. This initial mine in New Mexico's newest mining area came to life amid nationwide publicity last summer. —*Grants Beacon*

Atom Electricity Predicted By AEC Chairman Strauss

Atomic Energy Commission Chairman Lewis Strauss said there is justification for believing economical electricity from the atom may be attained in the U. S. sooner than even the most hopeful predictions.

Strauss clearly set out in a speech in Cleveland recently that he is highly optimistic about the nearness of competitive atomic power. He said it may arrive "possibly sooner than even the most optimistic of the prognosticators believe."

"There are areas of present-day research where break-throughs could occur to upset all our calculations," he said. "There is both justification and need for optimism." He did not supply any details, however.—*Pioche Record*

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Rep. Cliff Young of Nevada said recently that developments in Washington have aroused renewed interest in establishment of a small-scale experimental nuclear power plant in his state. Recent invitations have been made by the AEC to open the way for American industry to develop, fabricate, construct and operate experimental nuclear reactors. Nevada's chances for such a plant will greatly depend on its success in interesting industry in the potentials of the state, he said.—*Nevada State Journal*

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Magnet Cove Barium Corp. of Houston, Texas, will have its Battle Mountain, Nevada, plant in full operation by the first of the year, according to W. E. Edgar, resident manager. The mill, with a capacity of 200 tons per day, will be operated on a 24-hour schedule.

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Senator George W. Malone recently reported that the federal government has invested $1,499,321 to assist in Nevada explorations for strategic minerals. A total of 52 contracts have been issued in the state from April, 1951, to October, 1955. Twenty-one of the contracts involved a search for tungsten; 14, lead-zinc; three each for copper, lead-zinc-copper, manganese and mercury; two for uranium and one each for antimony, fluorspar and corundum. — *Eureka Sentinel*

DESERT QUIZ ANSWERS

Questions are on page 30

1—Gila Monster.
2—Cooking mescal.
3—Cahuilla Indians.
4—Turquoise.
5—Ephedra.
6—Colorado River.
7—Botanist.
8—Mountain climbing.
9—Spiders. The Tarantula Hawk is a wasp.
10—Arizona.
11—Botany.
12—Havasupai.
13—Igneous rock.
14—Friar with Coronado's expedition.
15—Nevada and Arizona.
16—Tucson is on Highway 80
17—Lieut. Beale.
18—Operation of the first transcontinental stage line to Southern California.
19—Arizona.
20—Salt River Valley of Arizona.

GEMS and MINERALS

NEW TRANSPARENT GEM STONE FOUND IN BRAZIL

A new gem quality material, amblygonite, has been discovered in Brazil. The new gem is transparent and dichroic in two shades of yellow. Tests made by the Gem Testing Laboratory of London indicate that its hardness is approximately 6, the specific gravity 3.029, refractive index 1.609, 1.626 and 1.637 and the composition (LiNa) Al P0f F,0H. Mrs. Betty Campbell of the Washington Lapidary Club has cut a faceted stone of amblygonite and reports that it handles like synthetic rutile. The stone resembles beryl, but is distinguished by its strong birefringence. — Oklahoma Mineral and Gem Society's *Sooner Rockologist*

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BLUE-GREEN SPANGOLITE IS STRIKING GEM MINERAL

Ford and Alice Wilson report that Spangolite is in several ways of more than usual interest. The color of this rare basic sulfate of copper and aluminum is a striking bluish green, a color that can be described as falling between the blue of azurite and the green of malachite.

Spangolite forms tiny, transparent, hexagonal crystals which may be hemimorphic, i.e., with the termination at one end different from the other. It was first described 65 years ago as coming from a locality then and still unknown "some 200 miles from Tombstone, Arizona." Subsequently, the mineral has been reported from six other localities in the world: Sardinia; St. Day, England; Grand Central Mine, Tintic, Utah; Majuba Hill, Pershing County, Nevada; Czar Mine and Copper Queen Mine, Bisbee, Arizona; and Metcalf Mine, Clifton-Morenci District, Arizona. — El Paso, Texas, Mineral and Gem Society's *The Voice*

OVER 800 KINDS OF IGNEOUS ROCKS FOUND

Two most common members of the igneous rock family are the granites, which predominate in intrusive rocks, and the basalts, which predominate in extrusive rocks. Every extensive formation of igneous rock is cut by joints that are arranged in more or less well-defined sets. The joint system may divide the rock mass into roughly cubical or rhomboidal masses. Sometimes the joint system forms columnar masses of basalt.

The important minerals of igneous rocks are quartz, feldspars, hornblende, augite, biotite mica and muscovite mica.

Over 800 different kinds of igneous rocks have been recognized.—*The Mineralogist*

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The Monterey Bay Mineral Society will hold its ninth annual gem and mineral show at the Y.M.C.A. building in Salinas, California, on Feb. 25 and 26. Doors will be open from 10 a.m. to 10 p.m. on the 25th and from 10 a.m. to 6 p.m. on the 26th.

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Chester L. Baker was recently elected president of the Oklahoma Mineral and Gem Society. Also elected were Mrs. Haskell C. Yount, vice president; Mrs. Alvin Markwell, secretary; O. C. Bundy, treasurer. —*Sooner Rockologist*

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Ed Reardon was unanimously elected president of the San Fernando Valley, California, Mineral and Gem Society. Also named to office were Maurice Hebner, vice president; Mrs. Selma Stang, secretary; Henry Hasbach, treasurer. — *Rocks and Gems*

POLISHING GEM SURFACES IS A DELICATE ART

Much remains to be learned about the polishing of gem stones. The average lapidary is content to know that under certain conditions which he can bring about, the surface molecules of a gem will "flow" to form a shiny film, slightly harder than the underlying material.

During the critical period when the buffing wheel can be felt dragging or pulling on the stone, these molecules, for reasons not yet determined, will flow almost like liquid to fill tiny sanding scratches and smooth out much the same as water in a glass. Water is also harder on the surface than underneath. This is known as surface tension. Polishing is a rearrangement of the gem surface, not simply a very fine cutting operation as once believed.

Not all materials respond to the same polishing technique. This explains the variety of buffing wheels and polishing compounds found in the lapidary shop. Soft material such as onyx is usually buffed on cotton; gems of about quartz hardness do well on leather. Since it is in this range that most amateurs start, it is suggested that the leather buff be the first one acquired. Minerals of the hardness of 7, 8 and even 9 polish well on a hard felt buff, although many emeralds and star sapphires are still both cut and polished on horizontal laps.

The beginner might do well to try one of the finest of many polishing compounds on the market, Levigated Alumina, on all but the tougher, harder stones. These he can more readily polish with Linde "A" Ruby Powder.—Ralph E. Hagemier in the Indiana Geology and Gem Society's *Geologem*

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New officers of the Long Beach, California, Mineral and Gem Society are Frank Pyles, president; John Gunning; vice president; Marguerite Bunch, secretary; Harvey Hardman, treasurer; Carl Brenner and Norris Bunch, directors.

Jewel-Like Arrowheads Made From Common Desert Glass . . .

There is as much profit in discarded and broken objects as one's ingenuity can develop. Jay Ransom of El Segundo, California, makes amethyst colored arrow points from common desert glass.

Desert glass, so familiar to travelers in the Southwest, gets its color through years of lying in bright sunlight. Old glass takes on the best color because its makers used manganese to "decolorize" the green effect of iron compounds in the glass-making sand. Under the action of ultra-violet light from the sun, the manganese is converted slowly into the purple permanganates. The longer a piece lies in the sun, the deeper the amethyst tint. Usually glass requires from three to five years to show the faintest tinge; 40 years produces an extraordinarily deep color of outstanding beauty.

Ransom, a writer whose hobby is mineral and gem collecting, uses the same technique the ancients did in manufacturing their points from obsidian.

After the shard has been roughed into general shape by tapping on the bench surface with a tack hammer, Ransom turns to simple pressure-flaking with the tip of a blunt instrument. To protect his left hand against the sharp slivers of glass, just as the ancient arrow-makers did with a piece of rawhide, Ransom cut a piece of leather to fit the palm, inserting the thumb through a hole to keep the rough glove in place.

He found the most efficient tool to be the Indian's carved prong of a deer's antler which has a rather sharp tip. Due to the natural curve, this tool can be given considerable pressure at the point of contact between the hard tip and the edge to be flaked. Where a deer horn is not available, a ten-penny nail or horseshoe nail will do.

It only takes a few minutes to flake out a rough point, but polishing it down with tiny, evenly spaced flaking to give it form and taper, a straight edge on each side, and an overall faceting to catch the light requires somewhat more time. The average shard was worked into a jewel-like arrowhead in about an hour.

Ransom made one variation in the ancient's technique—he utilized the rock-polisher's drill made of a fine copper tube turning in diamond bort. With this he drills holes in the bases of the most beautifully colored points and arranges them on a gold chain.—*The Mineralogist,* Portland, Oregon

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Friends of C. H. Smith will regret to learn that he died December 17 at the Hollywood Presbyterian Hospital where he had been taken late in November for medical treatment. "Rocksmith" as he was known to collectors and lapidaries, was one of Southern California's veteran hobbyists who had endeared himself to all who knew him. Five years ago he and Mrs. Smith erected a comfortable cabin in the woods at Mocking Bird Hill near Applegate, Oregon, for their retirement. Mrs. Smith plans to remain at the Oregon cabin where the home will always be open to the many friends.

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PROPER CUTTING ORIENTATION RESULTS IN BEST GEM COLOR

In cutting stones possessing easy cleavage, it may be necessary to orient the stone so the cleavage direction is not parallel to the direction to be polished, rather than letting the most attractive color be the controlling factor.

In colored stones, maximum of beauty of color and, to a lesser extent, brilliancy, is the desired aim. To produce maximum brilliancy, light falling upon the table and crown facets should be refracted and then reflected and finally emerge from the crown. The polish should be near to perfect smoothness as possible. Thus a maximum amount of light is reflected from the exterior of the facets on the crown and also from the interior of the facets on the base. Dirt on the base of a stone permits unnecessary leakage of light through the base and thus reduces brilliancy.

Spots of desirable color are sometimes placed near the cutlet in order to improve the appearance of an otherwise colorless or faintly colored stone. This is frequently seen in sapphires and amethysts. By variation from proper proportions the color of a pale stone is frequently improved; this is done by increasing the thickness of the stone, but this results in a sacrifice of brilliancy.—Victor Henry, Jr., M.D., in the Wichita Gem and Mineral Society's *Quarry Quips*

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In terms of all the common elements, the earth as a whole has been calculated to consist of: Iron as metal, 31.82 percent; nickel, 3.16 percent; oxygen, 27.71 percent; silicon, 14.53 percent; aluminum, 1.79 percen; iron with silicon, 7.94 percent; magnesium, 8.69 percent; calcium, 2.52 percent; sodium, .39 percent; potassium, .14 percent; sulphur, .64 percent; phosphorus, .11 percent; all others, .56 percent. — *The Earth Science News*

COLORADO PLACER MINER TEACHES TRADE TO VISITORS

William C. Spitz of Denver, Colorado, is one placer miner who has become tired chasing poachers off his "diggin's." He decided, instead, to cash in on them. For 25c a person Spitz allows them to visit his diggin's, examine his equipment and receive a lecture from him on placer gold mining. His diggin's are located on Clear Creek near Central City, Colorado.

For equipment, Spitz has a sluice box, a dam to divert water to his diggin's, a long tom riffle and the standard gold pan. He demonstrates how it all works, and then for $1 he allows the visitors to use his equipment for 30 minutes and put their newly gained knowledge to practice. All the gold they take out they can keep.

The sluice box carries water to the long tom riffle. The box has holes drilled in its sides to allow just the right amount of water to run into the riffle. The flow must be great enough to carry the lighter rocks down over the riffles and yet not so great as to wash away the gold.

The long tom is one-foot wide and about 10-feet long. Instead of cleats across its bottom, Spitz uses only two cleats to hold a common floor mat in place. This mat contains hundreds of small diamond shaped depressions which catch the gold and hold it far better than do the ordinary cleats. This mat can easily be taken up and rinsed off into the gold pan where the separation of the gold from other heavy materials takes place.

Spitz uses a small home-made wire basket of ¼ to ½ inch mesh to shake the gold bearing materials into the upper part of the long tom. This basket serves two purposes. First the gold bearing material is quickly and evenly fed into the long tom; secondly, the larger stones which remain in the basket can easily be discarded.

Crystals of yellow iron pyrites, hematite, magnetite, garnet (almadine) and other heavy minerals are found with the gold in the diamond shaped depressions.

After the mat is rinsed in the gold pan, the lighter material is rocked out in the usual manner. Extreme care must be exercised here for the gold can easily be lost over the side of the pan.

Next, Spitz places a handkerchief over a magnet and works it around the remaining materials in the pan. This removes the iron. When the handkerchief is taken from the magnet, the iron falls to the ground.

The garnets are picked out with tweezers and then the gold nuggets are removed in the same manner. Spitz uses a large eyedropper to pick up the flour gold.—Norm Moore in the Compton, California, Gem and Mineral Club's *Rockhound Call*

NEW GUIDE TO PETRIFIED FORESTS OF U.S. PRINTED

A new guide to the petrified wood collecting areas of America has been issued by the Mineralogist Publishing Co. of 329 S.E. 32nd Ave., Portland, 15, Oregon.

Petrified Forest Trails by Jay Ellis Ransom is a thorough coverage of the many localities where rockhounds can collect petrified wood. The author adds to the value of the handbook by presenting the broad, general geologic picture of each collecting area as well as details concerning specimens taken. Several fine photographs of interesting specimens are included in the book.

The author describes the origin and physical properties of petrified wood and carboniferous age forests. Eighty pages, paperbound, $2.

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MIDWEST'S BIGGEST GEM SHOW BEING PLANNED

Directors of the Midwest Federation of Mineralogical and Geological Societies and the American Federation of Mineralogical Societies announced that the July 12-15 joint convention and show in the Twin Cities will be the largest gem and mineral show ever held in the midwest. Ninety commercial booths and 750 feet of tall glass-front display cases will hold exhibits in three inter-connected exhibition type buildings. Unlimited free parking, free camp grounds and trailer park and many other features are planned by the show directors.

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Harvey Pierce is credited with discovery of the sandspike collecting area on Signal Mountain, Mexico. The discovery was made in 1936 and since then Pierce has donated over 6000 specimens of this phenomena to colleges and museums throughout the nation. Over 40 varieties have been classified varying in length from half-an-inch to three-feet. For some unexplainable reason 90 percent of all sandspikes are found pointing to the west. The spikes are usually found buried in sand mounds, some as much as six feet below the surface.—Coachella Valley Mineral Society's *Lik 'n Lap*

The old-fashioned sandstone wheel of every well equipped farm became an antique shortly after the first artificial abrasive, silicon carbide, was crystallized by Dr. Edward G. Acheson in his laboratory in Monangahela, Pennsylvania, in 1893. Since then, two other important artificial abrasives have been discovered: aluminum oxide and boron carbide. Silicon carbide is the most commonly used in lapidary work and, chances are, is the kind of wheel you are now using. —Paul Martin in *Gems and Minerals*

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CRYSTAL COLLECTORS MUST USE EXTREME CAUTION

Most important in collecting crystals is that the specimen be taken in perfect condition. A specimen with marred crystals loses much of its value. The collector must take into consideration the fact that crystals are of varied hardness and, more important, of varied degrees of tenacity. An advanced collector will treat all types of crystals as delicate, fragile and brittle specimens. Crystals should be properly wrapped for their trip home. Very fragile material must be placed in boxes on cotton or similar soft material. More durable specimens can be wrapped in tissue or ordinary newspaper. Never wrap two specimens together.

A detergent soap and warm water usually will clean the crystal once you have it safely home. Follow this with a soft brushing. Some crystals will not clean in this way and you may have to use acids. Experiment on poor specimens of the same material before attempting to clean the better specimens.

Crystals are stored in many ways and of course, labelling the specimens is very important. Include the name of the crystal, where discovered, chemical composition, the Dana number and other information that is felt pertinent on the label.

Arranging your crystals according to the elements is not difficult. Any mineralogy book will describe the elements contained in each mineral.—Jack Schwartz in the Montebello, California, Mineral and Lapidary Society's *The Braggin' Rock*

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Mary Frances Berkholz, California Federation field trip chairman, urged rockhound clubs to file mining claims on local collecting areas as a means of safeguarding them for future rockhounds and for other members of the hobby.—Coachella Valley Mineral Society's *Lik 'n Lap*

NEW GEOLOGIC MAPS OF CALIFORNIA NOW AVAILABLE

Eight sheets of the new geologic map of California are now available in preliminary form, the State Division of Mines reports. The eight sheets include: Death Valley, Long Beach, San Luis Obispo, Bakersfield, Los Angeles, Trona, Santa Maria and Santa Ana. Scale of the sheets is 1:250,000, on a topographic base prepared by the U. S. Corps of Engineers and the Geologic Survey.

The maps are in three colors and geologic formations are indicated by contact lines, but are not colored. Price of each map is one dollar plus three cents tax for California residents. Orders should be sent to the Division of Mines, Ferry Building, San Francisco 11, California.

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Nine Riverside County clubs will participate in the gem and mineral exhibits at the County Fair and National Date Festival at Indio, California, on February 16-22. The entire exhibit will be under one roof, in the new Junior Exhibit building. Many of the displays will feature rocks of the nearby desert area and some hobbyists will be at the show during fair week to explain the exhibits to both beginners and experienced rockhounds.

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Opal is an amorphous (having no definite form) form of silica containing water. Precious opal contains between three percent and 9 percent water, while common opal may contain as much as 22 percent water. —Verdugo Hills, California, Gem and Mineral Society's *Rockhound News and Views*

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The Rohr Aircraft Rockhound Club of Chula Vista, California, installed new officers recently. Seated were Geoffrey Baker, president; Lee Weatherbie, vice president; Barbara Furlong, treasurer; and Joyce Baker, secretary. On the board of control are Lyle Sheverman, Nathalie Black, Bob Marra, Ruth Weatherbie, Paul Fisher, Charles Dibble, Bill Furlong and Bill Bennett.

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The Eastern Arizona Gem and Mineral Society has filed 20 placer mining claims in Limestone Canyon, near Clifton, Arizona, in order to reserve that area for future collecting by hobbyists. All rockhounds have been invited to collect at the club's claims. —*Gems and Minerals*

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Elected president of the Gem County Rock and Mineral Society was E. C. Brookins. Other officers who will serve with him are Mrs. Zella Kent, vice president; Mrs. Myrtle Albee, secretary; Mrs. Grace Monroe, treasurer; A. R. Albee, federation director; Mrs. Cora Holman, publicity chairman.

AMATEUR GEM CUTTER

PROPER USE OF SILVER SOLDER IS STRESSED

One of the most important items in jewelry work according to Raymond Addison of the San Jose, California, Lapidary Society is silver solder. The wrong kind of solder can produce failure and difficulties and there are many silver solders on the market that have no place in jewelry making—solders, for instance, that are made for industry and are used to solder steel, copper, brass and other metals. As a rule these are unfit to use with sterling silver because they are usually yellow in color and many of them have high melting points.

Producers of fine metals make several solders, each melting at different degrees of heat. It is very important that you know at what heat a solder will melt. For instance, if one is making several soldered joints on the same piece, it is better to use a solder with a higher melting point for the first joint and one with a slightly lower melting point for the last joint. The reason is obvious—the first joint will not be affected when you make the second weld. A bezel, for instance, will not come unsoldered when you put on the safety catch.

Usually, two grades of solder are all the amateur jewelry maker needs, one that melts at about 1350 degrees and one with a 1150 degree melting point. It is best to specify the melting point when ordering solder from a manufacturer rather than merely ordering by solder number for these numbers vary with the producers.

Shun the use of high-heat solders. Sterling itself melts at just a little higher temperature than the solder, and trouble is in store for you if high temperature solders are used. —*Gems and Minerals*

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EASY WAY TO MOUNT STONE AS A LASTING LAPEL PIECE

The simplest way to mount a rare specimen as a lapel piece is to lay the stone on a piece of 18 gauge silver, trace around it with a sharp awl and then draw flanges at strategic points on the outline. Flanges must be long enough to anchor the stone tightly when bent up around it, but not so long that they detract from the stone design. Cut out the silver pattern, solder a pinback on the reverse side, lay your stone in place and very gently ease the flanges into place.

If you want something more ornate, lay your stones on a large piece of paper and make several tracings of the shape — and then let your imagination go to work. You will eventually come up with something pleasing. Cut the background sheet on 16 or 18 gauge silver from your pattern. Make it enough larger than the stone to take care of ornamentation. Excess metal can be filed off after the soldering is completed.—Ernestine Thomas in the Minnesota Mineral Club's *Rock Rustler's News*

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When polishing a thin slice of material, such as iris agate, dop it to a larger piece of agate and then proceed to sand carefully, bringing the stone in contact with the sander for only a few seconds at a time. The larger piece of agate will tend to draw the heat away from the thin specimen.—*Lapidary Journal*

ORIENTING ASTERIATED QUARTZ FOR BEST CABOCHON RESULTS

A six-rayed star is exhibited by asteriated quartz when it is cut so that its optic axis runs through the center of the top of the cabochon. The optic axis can be located with a simple apparatus consisting of two pieces of polaroid, a means of supporting them in a "crossed" position and a light source. The latter can be any source that gives a beam of light smaller than the piece of polaroid. A small hole cut in a cigar box containing a light bulb will do.

Place one polaroid over the light source and support the other a few inches above it with a bracket or other means. To "cross" the polaroids, turn on the light source and while looking directly into it through the two polaroids, rotate one of them until the position of greatest darkness is reached.

With the polaroids "crossed" you are now ready to examine the rough piece of quartz which is held by hand between the two polaroids and examined in the same manner as for "crossing" the polaroids. The piece of rough quartz must be free of large surface opaque areas that do not pass light readily, and the location of the optic axis is best done in a dark or dimly lit room.

Step 1. Slowly rotate the piece of rough about a vertical axis. If one piece of rough remains dark while being rotated 90-degrees, its optic axis is vertical. Mark it. Slice the piece of rough perpendicular to this axis and use the cut as the base of the cabochon. Usually the quartz will not remain dark while being rotated, but will be alternately light and dark. This means the optic axis is not vertical. The optic axis can still be located by making a series of rotations about imaginary axes. For brevity in the following directions, an imaginary horizontal axis pointing away from the person who is manipulating the piece of rough will be called the north-south axis. An imaginary horizontal axis runing from right to left will be called the east-west axis.

Step 2. Rotate the piece of rough about its vertical axis until it become dark; then rotate it about the east-west axis. If the piece of rough remains dark, carry out Step 3. If it is alternately light and dark, skip Step 3 and carry out Step 4.

Step 3. Rotate the rough 45-degrees clockwise about the vertical axis then rotate it about the northwest-southeast axis until the piece of rough become dark. The optic axis is now vertical. Mark it. Slice a piece of rough perpendicular to this axis and use the cut as the base of the cabochon.

Step 4. Rotate the piece of rough about the vertical axis for approximately 90-degrees until it becomes dark, then carry out Step 3.

The final check on whether the optic axis is vertical is to rotate 90-degrees about the vertical axis. If the optic axis is vertical the piece of rough will remain more or less uniformly dark, depending somewhat on surface irregularities. If the final check reveals that the optic axis is not vertical, grasp the piece of rough in a new position and start over with Step. 1.—*Georgia Mineral Newsletter*

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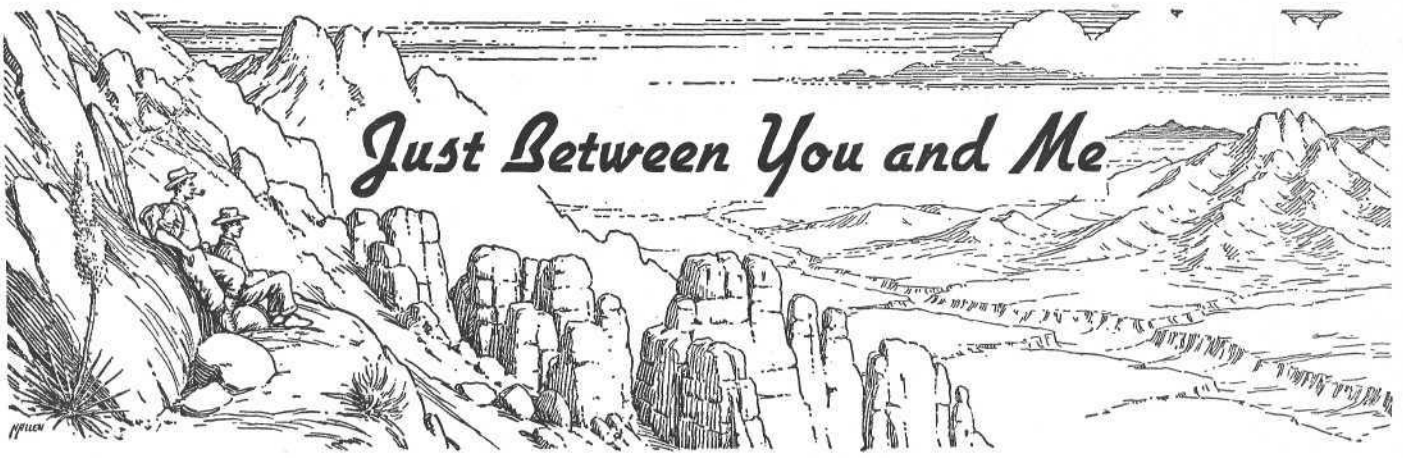
From Australia comes the news of the discovery of a 820-carat black star sapphire near Ruby Vale. The stone is the size of a golf ball and may be the largest star sapphire ever found.—*The Mineralog*

Easy does it when holding stones for shaping on the grinding wheel. By resting the stone on the forefinger and supporting the upper back corner with the thumb, or back of both upper corners with two thumbs, you can shape the top on all sides without fear of gouging the stone or the wheel. A damp tip of the forefinger will hold your cabochon safely against the side of a vertical smoothing wheel when working on the flat bottom of the cab. A padded arm rest, proper lighting, and freedom from annoying spray are aids for relaxation.—Minnesota Mineral Club's *Rock Rustler's News*



By RANDALL HENDERSON

MY NEIGHBORS in the Coachella Valley of California are about to make a very important decision—and since the problem is one which sooner or later will confront many other communities in the Desert Southwest I want to bring it out in the open.

Coachella Valley is a small community — approximately 10 miles wide by 40 miles long, almost entirely encircled by mountains, with a year-around population of 22,000, and a winter population of double that number.

We have two main industries—agriculture and resorts. Last year the 49,594 acres in cultivation produced crops valued at $26,152,000, of which grapes were No. 1 and dates No. 2 in gross returns. Tomatoes ranked third and grapefruit fourth.

The resort industry includes accommodations and services for visitors who range all the way from transient tourists to recreation and health-seekers who remain through the winter season. While no exact figures are available, the estimates of our resort income range from $22,000,000 to $34,000,000 a year.

The agricultural industry centers in Indio at one end of our valley and the resort industry at Palm Springs, 25 miles away, at the other end of the valley. Palm Desert is half way between. There is no sharp line of cleavage. Some of the finest date gardens are on the outskirts of Palm Springs, and Indio derives millions from transient and seasonal tourists.

So much for the background of the controversy which now threatens the peaceful co-existence of our community.

Indio, not satisfied with the multi-million dollar agricultural and resort industries we now have, wants to add a third—manufacturing. Directors of the Indio chamber of commerce have announced that they want industry—light, heavy, any kind of industry that will increase the local payrolls. They have already approved the construction of an ore reduction plant not far from their city limits. They like to refer to this policy as "progress."

Palm Springs and our Woman's Club here in Palm Desert, realizing that the main tourist attractions of our valley are its winter sunshine, pure air and the beauty of our snow-capped horizon, and that the air pollution of factories and truck traffic of heavy industry could destroy all this are against it.

Many of the fruit and vegetable farmers in Coachella Valley share this view. They have visited the Los Angeles coastal plain on the other side of the mountains and have seen what an almost perpetual cloud of thick brown smog is doing to the vegetation in such places as Riverside and San Bernardino and Pomona and Santa Ana. They are afraid of what will happen to their grapefruit and dates and leafy vegetables if heavy industry comes to this valley. The experience of other communities provides ample evidence that these fears are well justified.

Americans of this generation have grown up with the idea—if they stopped to think of it at all—that pure air and good water are inexhaustible resources. Every chamber of commerce was seeking more industry—and any industry which brought a jingle to the cash register was good.

Unfortunately, that is no longer true. The pressure of increasing population and our growing dependence on the gadgets of factory production have brought us to the time—whether we like it or not—when we must evaluate our air and water resources and determine whether or not they are to be conserved. Many years too late, Los Angeles has come to this realization—and recently announced that future applicants for industrial sites are to be screened as to their use of water and their potential for air pollution.

In a little valley, rimmed in with mountains as we are here in Coachella, we cannot have both heavy industry, and a prosperous resort and agricultural economy. It will not take much heavy industry to give this valley a perpetual overcast of smudge—and if that time comes we will have killed the goose that laid the golden egg—for agriculture cannot thrive in such an atmosphere, and the winter tourist business will go to Nevada or New Mexico — to places like Wickenburg and Sedona in Arizona where far-sighted community leaders have taken a firm stand against any industry which pollutes the air or contaminates the soil.

Heavy industry is necessary. There are places for it where the water supply is abundant and geographical features permit the free movement of air. Undoubtedly the time will come when chemical and mechanical invention will solve the problems of atmospheric contamination. But that probably is many years away.

If a community wants heavy industry, the good old American tradition of free enterprise gives to every group the right to determine what its economy shall be. But there should be no illusions. Heavy industry does not mix with a prosperous agricultural and residential community where people come for retirement, health and recreation.

One of the things I have learned about my neighbors during 45 years on the desert frontier is that in every community there are always two groups: (1) Those who have come to this desert community to establish permanent homes. They are the folks who build for the future. (2) Those who come to the new community to make a stake and get out. To them, life on the desert merely is something to be tolerated and money is the only thing that counts. It is a sorry day for the future of any town which entrusts its policy-making functions to those whose only stake in the community is to-get-rich-and-get-out.

BOOKS of the SOUTHWEST

THE DESERT THAT LIES BEYOND THE MASK OF ARIDITY

"There are places where the creosote bush is a more useful plant than cotton. . . . We must live for something besides making a living. If we do not permit the earth to produce beauty and joy, it will in the end not produce food either."

These are the conclusions of Joseph Wood Krutch, naturalist-philosopher, whose home is on the desert near Tucson, and whose most recent book *The Voice of the Desert,* is one of the most illuminating interpretations yet to be published on the botany and biology of the desert world.

Krutch's book is for those who would see beyond the mask of the desert to the processes — sometimes complex but always interesting to an eager mind—by which the denizens, both plant and animal, survive and multiply in this arid land.

While the author is a scientist, scientific observation means little to him unless it contributes to the vast fund of knowledge which human beings need to retain a proper sense of values in charting their own lives.

Since men and women are a part of the same world and the product of the same creative forces as are the dippodomy and the saguaro—and have many of the same problems to solve—the observations of a scientific man who is also a philosopher are interesting to the layman no less than the scholar.

While Dr. Krutch is a comparative newcomer to the desert, his five years on the Sonoran llano at Tucson have been years of intensive study, and *The Voice of the Desert,* is the second volume to come from his studio, his previous desert book, *The Desert Year,* having been published in 1952. In the east he is widely known as a teacher, drama critic, biographer, journalist and public speaker. His Ph.D. degree was granted at Columbia University where he held a professorship of dramatic literature.

Published by William Sloane Associates, New York. 223 pp. Half tone illustrations. $3.75.

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18TH CENTURY MISSIONARY EXPLORES THE SOUTHWEST

The four original manuscripts narrating the explorations of *Jacobo Sedelmayr,* missionary frontiersman in Arizona and Sonora, are translated and annotated for the first time by Peter Masten Dunne, in the book published by the Arizona Pioneers' Historical Society.

Jacobo Sedelmayr was born in Bavaria in 1722, and like his predecessor, Jesuit Francisco Kino, entered the Spanish mission field in America. He was assigned to the mission of Tubutama for 16 years, then to southern missions, and "set up the finest record for exploring north country and perhaps for missionary efficiency."

His first account, *Relacion,* narrates his explorations of 1744 from Tubutama mission to Gila River, up the Colorado to Bill Williams Fork. The second is a log of the journey in 1749 into Yuma country. The third is the diary of an unknown ensign among soldiers stationed in Caborca and their trek down the Colorado, accompanied by Sedelmayr. His letter to the Viceroy in Mexico City in 1751 is the fourth account, explaining the need for missions along the Gila and Colorado rivers.

The translating of Peter Masten Dunne, S.J., Chairman of the Department of History, San Francisco, preserves the vision and zest of the missionary explorer's writings. *Jacobo Sedelmayr* is worthwhile, factual reading of life in the southwest in the latter part of the eighteenth century. It is a beautifully printed volume with handset chapter headings, biographical sketch, notes on each trip, map of the travels and photographs of mission Tubutama. Number one of the Great Southwest Travel series. 82 pages, with index. $7.50.

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STORY OF THE 20-MULE TEAM BORAX WAGONS

Nearly everyone knows about the 20-mule team borax wagons which freighted across Death Valley in the 1880s. In motion pictures, radio and television—and on the shelves of the grocery stores wherever borax is sold —the 20-mule teams have been glamorized.

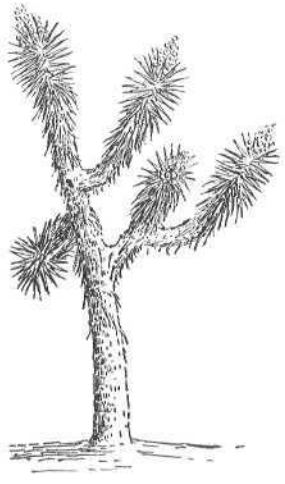
But detailed and authentic records of that colorful episode in western mining history have seldom appeared in print—and it is to fill this gap, and to reconcile some of the contradictions of previous reporting, that Harold O. Weight has compiled the third booklet in his Southwestern Panorama series: *20-Mule Team Days in Death Valley.*

Insofar as has been possible Weight obtained his material from original sources — from old-timers who knew the men and their mules and from the records of that period.

The new publication is in two editions, the first being a limited printing of 750 copies which contains the 1883 report of California State Mineralogist Henry G. Hanks. A second edition without this report also is available.

Published by Calico Press, paperbound, halftone illustrations and map. First edition 44 pages, $1.25. Second edition 36 pages, 75c.

BOOKS ABOUT THE THINGS THAT LIVE AND GROW ON THE DESERT



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